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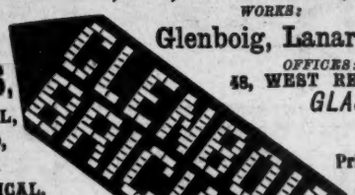

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EDITORIAL NOTES.

Reorganization—A Limited Advance.

FROM the Hon. Secretary to the National Gas Committee (Mr. W. E. Price) we have received for publication a short note as to the almost negative issues of the conference of the Councils of the Institution of Gas Engineers and the Society of British Gas Industries, the General Committee of the British Commercial Gas Association, and the Committee of the Gas Companies' Protection Association, regarding the subject of the fitting of the gas industry with a fully representative and effective premier organization. The note is a "splendid example" of extreme economy in information—in fact, if matters of national importance in connection with the war had been dealt with at the conference, instead of a domestic matter for the gas industry, and the information had undergone censoring at the hands of those in authority at the Government Press Bureau, greater discretion could not have been observed. But is this wise? Although the "JOURNAL" has had a large part in dealing with this for the industry genuinely serious question of reorganization, it would not urge, if general publication of the proceedings was thought undesirable, for the admission of members of the press to a conference on the subject. But, in issuing official statements or reports, it should be remembered that other information will circulate, and that in the circulation it has a tendency to gradual removal from the region of exactitude. It would, in this instance, have been much better for a fuller indication of the trend of the proceedings to have been officially given, than that there should have been reliance, by those interested, but not at the conference, solely on oral reports, which in the main may be similar, but not in respect of all details. However, we will at the present time remain loyal to the obvious desire for privacy, and not discuss matters that were introduced at the conference, but to which there is not official reference.

It will, however, be observed that there are three pieces of information vouchsafed in Mr. Price's communication. The first is that the attendance at the conference was "large and representative." This is satisfactory, because it is good testimony to the interest that is being taken in the matter, and, we may add, by some of the foremost and therefore most influential men in the industry. The second point is that, after a general discussion of the subject, the principle of co-ordination was approved. This, too, is very satisfactory up to a point, but only up to a point. What, however, does it mean that "the principle of co-ordination "was approved?" Co-ordination of what—the various existing organizations, and their work? Or does it embrace, though the term does not suggest it, the extension of the representation of the interests of the industry in the manner which has been so much discussed of late? We think it does; otherwise the work of attempting to design and construct a premier representative body might just as well cease, and no further trouble be taken over it. The third point is that it was agreed to refer the matter for further consideration and report to a Committee composed of seven representatives from the four bodies already mentioned above. This action alone would debar any public discussion of certain features in the proceedings last Wednesday which have been the subject of fairly general conversation. But a considerable responsibility rests upon that Committee now in the matter of producing a scheme that will be acceptable to the whole industry, and give to it a powerful union of interests. In doing this, too, the Committee will require to exercise good diplomacy, in order to compose views that at the moment are a little divergent, but are held in quarters where, we feel confident, there is to be found a common objective, and that is the promotion of the highest interests of the entire gas industry.

While writing on the subject of the conference, attention may be directed to an article in other columns, headed "An "Outline Scheme for a Central Organization." In the main, the article, it will be seen, is composed of a letter that was sent some time ago in answer to an inquiry by an esteemed correspondent. The scheme is not suggested as a finished product; it merely consists of an accumulation of nascent ideas which require modifying and developing, by those in whose hands (and brains) the responsibility rests, to arrive at a completely representative and effective organization.

Standard of Calorific Power Bill.

THE Gas (Standard of Calorific Power) Bill was down for second reading in the House of Commons last Wednesday [*ante*, pp. 493, 500]; then it was postponed until Thursday, and then there was a further deferment until last evening. Whether the Bill took a step forward yesterday is not known at the time of going to press. So far, there are not many signs of opposition. It was hardly likely there would be to a measure that the Government considered essential and politic, and which is being introduced by the Board of Trade. Being under such protection, there should be little difficulty in giving the necessary quietus to any hostility. There are, it seems, some people, even among legislators, who are living in the past so far as gas supply and its material and immaterial qualities are concerned. For instance, Mr. T. M. Healy tabled a motion to the effect that the House declined to proceed further with a measure which would depreciate the illuminating power of the gas supply, without making any provision for a corresponding reduction in the price; and Mr. King is responsible for another motion, declaring it is inexpedient to proceed with a measure which is not emergency legislation, and has no time-limit for the period of war. These two motions well illustrate the ignorance that exists on the whole subject. As a war measure, the Bill is very necessary, in view of the requirement of the Ministry of Munitions that more shall be done in the oil-washing of gas for enhancing quantitatively the supplies of benzol and toluol; and, as a post-war measure, it is also highly important, in that it will assist in securing the raw materials—especially benzol—that are very essential to substantial home industries, as well as protecting the country by assuring a home-provided supply of motor fuel, and making permanently available the means of obtaining large supplies of the materials requisite for the making of explosives. Far from it being inexpedient, it is very expedient that the Bill should be proceeded with, and become law as early as possible.

The question is altogether a larger one for the nation than the mere retention of a useless illuminating power standard. It is trifling with an important national matter for Mr. Healy in 1916 to talk of illuminating power and price reduction, when a reasonable and useful calorific power is what is desirable, and not illuminating power, in view of the substantial additional value in illumination that gas consumers can realize by using incandescent mantles. As to the reduction in the price of gas, this will come along right enough when the cost of coal is lowered. Meantime, gas undertakings are, even with the higher prices they are compelled to charge, finding it difficult to pay even a slender dividend upon the capital they employ. They would like Mr. Healy to show them how—remember, they are putting in a large amount of work for the country, without recompense, or with inadequate recompense—they are to make price reductions in these times. As to the future, sliding-scales, maximum prices, competition, and financial con-

ditions laid down by Parliament afford abundant and certain protection to the consumers where the suppliers are companies; and, where gas undertakings are in the hands of local authorities, the consumers have their remedy by moving their own elected representatives to see that they are properly defended in respect of the price charged for gas. Beyond all this, beyond also the necessity in the interests of progress for the shifting of the standard from the non-essential quality to the essential one, there is now ample precedent for the change in standard being made without in any way interfering with any of the other conditions subsisting between consumers and gas undertakings. The gas business is carried on in competition with other trading enterprises with which it is impossible to enter into understandings as is the case with other forms of trading; and the statutory regulation of price and dividend and other obligations does not give any scope for collusion of a kind which is all too prevalent to-day in connection with other ordinary necessaries of the community.

Quixotic Coal-Economizing Proposal.

Coal has had a rest in these columns just recently; but if there has been any apparent negligence over the matter, it has been completely removed by an announcement made in "The Times" last Friday as to certain coming coal-economizing instructions of the Board of Trade. These, it is stated, take the shape of compelling coal economy by putting gas and electricity consumers under penalty if they do not comply with certain conditions. The idea cannot be seriously regarded; but really after the wonderful scheme for a 10 per cent. reduction of coal used for the provision of agents for lighting purposes, one has no excuse for being surprised at anything. The announcement in our morning contemporary is as follows: "The Board of Trade are becoming "increasingly anxious about the consumption of coal, and "are considering the imposition of restrictions. It is understood that one of the proposals which is being discussed is "the enforcement of economy in coal on the user of gas and "electric light by charging him double rates on any excess "over 75 per cent. of his accounts for the corresponding "quarter of last year."

It is sincerely hoped that the anxiety of the Board in regard to coal will not lead them into any greater ludicrous action than the example to which allusion has already been made. However, in case this hope has no secure foundation, we will glance at what the statement means, and at its effects. Its simple meaning is that the consumer must drop his consumption of gas or electricity by 25 per cent. in comparison with the corresponding quarter of last year, or he must pay double rates for any excess above the 75 per cent. proportion. If the Board are actually contemplating anything so rash, there are various points that they might remember—at any rate, in connection with gas. In the first place, in the corresponding quarters of last year, consumers had already began their economizing practices, and supplementing that condition is the operation and effect of the Daylight Saving Act. For the most part, therefore, the gas now used for domestic purposes in the summer months is for cooking and water heating. This would be the direction in which the gas consumption would have to be cut down, in order to secure the suggested 25 per cent. reduction. Cut down the gas consumption, and up must go the household coal consumption—thus defeating the very object the Board would have in view; and—worse still—the capacity of the gas industry in maintaining the supplies of benzol and toluol would be further curtailed. Then, again, we rather think the Board of Trade would, in order to carry out this pretty penalizing scheme, have to get altered the legislation governing sliding-scale gas companies, seeing that their dividends are governed by the price charged to the ordinary consumer. Further, who would benefit by the revenue derived from the double rates? Then what of works engaged upon war material? Really, the whole idea is too absurd to contemplate; yet we are in such close proximity to certain other Departmental absurdities, that——well, we will not now say more, but will await developments, which, it is hoped, will never come after the manner suggested. If the Board would but prohibit the destruction beyond a certain point of crude coal in household grates and under steam-boilers (after a given notice, unless satisfactory reason for continuing it could be given), they would be doing some beneficial work in releasing coal for other purposes.

Spontaneous Combustion and Oxygen Absorption by Coal.

The considerable amount of investigation and study, in comparatively recent years, of the causes of the spontaneous combustion of coal has led to the almost universal acceptance, among those who heed the progress of knowledge, and do not continue to encourage the mistaken beliefs of the past, of the fact that the absorption of oxygen by coal is one of the principal causes of its heating-up, and therefore of its spontaneous combustion. The question is one of importance to the owners and responsible engineers of gas undertakings whose stocks of coal, through external influences, have tended—in times when they can get surplus deliveries for storing—to increase rather than to diminish. In any circumstances, more especially in these, all investigation that throws light on the subject of the spontaneous combustion of coal, and therefore has practical value, is welcome. Such value is found in an extensive investigation that has been made by Mr. T. F. Winmill, B.A., B.Sc., the Chief Chemist at the Doncaster Coal Owners' Laboratories. The results of the research have been incorporated in various papers read before the Institution of Mining Engineers; but space will not allow of their reproduction *in extenso*.

There is some divergence of opinion as to the relation of oxygen absorption to the surface of coal; and this is of importance to those who have to store the material in large quantities. In some of the earlier experiments, Mr. Winmill found that the absorption of oxygen is not proportional to the outer surface of coal dust. Later experiments have been now extended to coarse coal passing a two-mesh sieve. The data in the paper show the important result, that in a given time coarse coal will absorb less oxygen than coal dust, but that as time passes the difference in the rates of absorption becomes somewhat less. This indicates that, after a "very long time" the total oxygen absorbed by the coal is practically independent of the state of division. A further corollary is that ultimately the same quantity of heat will be produced by the atmospheric oxidation of either lump coal or coal dust. But there is the important difference that the rate of production of heat is much slower with the lump coal than with the dust, and thus the heat produced has every chance of becoming dissipated, so avoiding any increase of the temperature of the coal. Of course, if, through any circumstance, there is a reduction of the size of the coarse coal, this would increase the rate at which oxygen is absorbed. All the evidence from Mr. Winmill's investigations makes it clear that oxidation is not simply proportional to the outer surfaces of the coal particles, nor is it a simple surface action, but that in some manner the oxygen penetrates the coal particles. However, the outstanding fact is that the state of division of the coal has a most important bearing on the possibility of spontaneous heating; and, other factors being equal, coal dust is more likely to originate combustion than lump coal.

Another branch of the inquiry referred to the effect of the variation of the oxygen percentage in air on the rate of absorption. This is a point that has only academical, and not practical, interest for the gas engineer, inasmuch as he stores his coal with an environment of normal air, and therefore of an oxygen content of approximately 21 per cent. However, the experimental work showed that the effect produced on absorption is not directly proportional to the reduction of the oxygen percentage; for when the oxygen percentage was reduced to 8, the rate of absorption was still 65 per cent. of that with normal air containing 20·9 per cent. of oxygen. With coarse coal, the rates of absorption showed exactly the same variation as with fine dust. Practically the only effect of reducing the oxygen percentage in the air is to reduce the rate of its absorption by the coal; but this reduction is not one of simple proportion. For example, the percentage of oxygen in the air has to be reduced to 6 before the rate of absorption falls to half that in normal air. But while the connection between the oxygen percentage and the rate of absorption is not one of simple proportion, there is, we gather from Mr. Winmill, a simple relation between the two—viz., the rate of oxidation is proportional to the square root of the oxygen percentage of the air; but no definite meaning can be given to this fact. Of course, absorption is complicated by the number of substances in the coal which possibly take part in the reaction, as well as by the physical structure of the coal itself.

The interest attaching to the long research, and to the considerable presentment of data, is carried into an investi-

gation into the rates of absorption of oxygen by different varieties of coal. Naturally, as coals differ so considerably in composition and physical characteristics, one would expect that the rates of absorption would differ; and this is shown to be the case by submitting to test dissimilar coals from different fields. But, in several ways, coals follow no general rule in this matter of oxygen absorption. For example, in some coals as the temperature rises, the quantity of oxygen the coal is capable of absorbing also seems to increase; but this is not the case with all coals.

However, it is clear from the papers that, in testing a coal for ascertaining its liability to spontaneous heating, great care has to be exercised in making complete exploration. An ultimate analysis of a coal appears to give little definite information. It may, according to Mr. Winmill, be taken broadly that a coal which contains both a high percentage of moisture and a high percentage of oxygen is usually more oxidizable than one with a low oxygen and a low moisture content. But the oxygen percentage by itself is no guide to the capacity of a coal for absorbing oxygen; a high natural moisture content is, on the whole, a more reliable indication. And, again, no one constituent of the coal can be said to vary regularly with the oxygen absorption. The quantities of oxygen and moisture already in coal do not themselves influence the absorption of oxygen, but are indications of the presence of other compounds, or classes of compounds, in the coal substances which are easily oxidized. It is obvious that if water had any direct influence on the absorption of oxygen, then the addition of water to coals of low moisture content would increase their power of absorption; but in every sample of which the oxidation was measured by Mr. Winmill, the natural water present was enough for the coal to exert its full capacity. At the same time, the complete removal of the last traces of water does reduce the rate of absorption considerably; but the readdition of 1 per cent. of moisture is found to be amply sufficient in most cases for the coal to regain its activity.

Regarding the atmospheric oxidation of iron pyrites, at one time the opinion was widely held—in the gas industry as elsewhere—that the initial heating of coal was due to this cause. But the atmospheric oxidation of coal itself is quite sufficient to explain the nature and origin of fires without the intervention of other substances, though, of course, it is possible that in some cases pyrites, under certain conditions, may be an important contributory factor. The conclusions to be drawn from Mr. Winmill's research in this particular direction are that the oxidation of pyrites differs in some respects from the oxidation of coal, and the differences arise from the fact that the former is a simple chemical reaction, while the latter is a complex one. He also finds that the rate of oxidation of pyrites in the pure state is affected much more by the size of the particles than is the oxidation of coal, and that an increase of temperature causes a somewhat greater increase in the oxidation of pyrites than it does in that of coal. Experiments on a specimen of finely divided pyrites lead to the conclusion that where pyrites in that condition exists in considerable proportion among coal, it may be the chief factor in originating combustion.

These are the chief lessons to be derived from the researches carried out by Mr. Winmill; and there can be but little question that the series of papers detailing the results of the work will be allocated a classical place. At any rate, they should be of immense help to the Home Office Committee appointed to inquire into the question of the spontaneous firing of coal in mines, as well as to colliery owners, and to those who store coal in large bulks.

Chief Engineer Vacancies and the Deputy Engineer.

When the engineer and manager of a gas undertaking retires, the filling of the position is one which admittedly carries with it, in certain circumstances, a large amount of responsibility. In this matter circumstances have a considerable bearing. It may be that the chief engineer has had an assistant or deputy who has rendered for a number of years good and loyal service, and who has all the qualifications, personal and technical, which make him a fit and proper person to succeed the chief when the time comes—and no one then better, for the assistant is well acquainted with plant, district, men, routine, policy, and so forth, and all this is of genuine value in the running of an undertaking. On the other hand, some works may not be in the position to maintain, in addition to the engineer and manager, an assistant who would be fully qualified for elevation (when the time arrives) to the superior office; and then it is necessary to look outside for a new occupant. It may be, too, that, through a necessary retirement due to ill-health or other causes, or to an appointment to a larger and more lucrative office in another concern, or to death, the office of engineer may become vacant before the assistant engineer has arrived at an age or has had sufficient experience to justify his appointment to the higher office. Then, again, a new chief must be sought for outside the works.

These considerations arise on the appearance of an advertisement from Birkenhead, inviting applications, by July 7, for the appointment of a gas engineer, on the retirement of Mr. T. O. Paterson, who will, on relinquishing his office, continue his association with the concern as Consulting Engineer. Knowing well the circumstances of Birkenhead, we should, had we given any thought to the matter, have anticipated an advertisement for an Assistant Gas Engineer; for throughout the profession it must have been regarded as a foregone conclusion that Birkenhead had made fit and proper provision for Mr. Paterson's successor in the Deputy Gas Engineer, Mr. R. H. Brown, who has (it must be quite a decade now since he went to Birkenhead) for some years—and those years of considerable difficulty, which has not been lightened by the indisposition of the chief—taken a large part in the control and management of the undertaking. This is such a prominent example of a case where the right man, with every qualification and experience, and knowing the whole of the plant and business of the undertaking, is at hand for accession to the higher office, that we can only think it must be due either to some slavish adherence to a custom, or to pressure from some quarter in which there is insufficient appreciation, or complete ignorance, of the facts, that the advertisement for a gas engineer has appeared. We are sorry, because it puts Mr. Brown, with his experience of the undertaking, the borough, policy, and all else (which must be of value to the Corporation), into competition in respect of salary with other engineers who have not the same local knowledge, or who have not rendered the Corporation the same excellent service through times of considerable stress. These considerations in justice to a deputy or assistant engineer should not be overlooked. Birkenhead is only an illustration; we should say the same thing in respect of other deputy or assistant engineers in the same circumstances.

Then, further, we cannot understand a Corporation with a gas undertaking having an output of about 1000 million cubic feet a year, putting the position of the chief executive official up to competition in respect of salary. Is the lowest "tenderer" to have the position? If so, we should fear for the future of the concern. The "gas engineer and manager" who assesses his services at a low figure is a person to be avoided; for he is generally one who is glad enough to get a job, and whose qualifications have not carried him far from the bottom positions in the professional ranks. The engineer and manager of a works making 1000 million cubic feet of gas a year is a man in a very responsible position, requiring large and varied technical and commercial training and experience, which entitle him to adequate remuneration for his services; and a Committee of business men ought to be in a position to offer a salary that will attract the best men. So far as Birkenhead goes, it appears to us that there was no occasion to advertise the position of Gas Engineer, much less to make salary competition a feature of the proposed appointment.

Pitch Carbonization.

The paper on this subject that Mr. E. W. Smith, M.Sc., submitted to the Midland Junior Gas Association on Saturday has its cardinal interest concentrated in the tabulated data as to the results of carbonizing with coal various pitch materials and in various proportions—including Mond pitch—on a large working scale. The data will repay study. They show that some pitches are more suitable than others for admixture with coal; and that this point should be taken into account, as well as the one as to the best proportion of a given pitch that should be mixed with a given quality of coal. It does not do take a fixed percentage of pitch, and say that this will apply to all qualities of pitch and coal, and to all carbonizing conditions, for the production of the best results. It will be observed that Mr. Smith states that any of the qualities shown in the tables could be carbonized without

inconvenience up to 6 per cent., but that above this percentage trouble arose with stopped pipes. In conjunction with the 6 per cent., the tabulated data should be carefully examined. Many points gained from experience are found in the paper; but one of them will bear frequent insistence, and that is the necessity for intimate admixture of the pitch and coal—for one thing in order to obtain a fairly uniform coke. How this is accomplished at Birmingham is explained by the author.

Case Hardening of Mild Steel in Gas.

Such work as Mr. C. M. Walter, B.Sc., described in the paper on this subject before the Midland Junior Association last Saturday, should be given a wider circulation among steel manufacturers. Little work has been done in this country on the subject of the use of town gas as a carburizing or case-hardening agent; but Mr. Walter's experiments prove that its use for the purpose in the case of mild steel is highly effective, and a good commercial proposition. This conclusion confirms Professor A. H. White and Mr. Homer T. Hood, whose investigations [published in the "JOURNAL" for Nov. 9 last] are quite of a classical order, and would well repay more attention being given to them than they have yet received in this country. Their investigations proved efficiency, equality of product, and controllability such as cannot be realized with the solid agents ordinarily employed for the purpose. It is important in this carburizing work that the rate at which the gas is conducted through the apparatus should be slow, as this affects the quality of the carburizing. An attempt to do the work too rapidly will give unsatisfactory results.

Absenteeism and Coal Supplies.

From the lines of the efforts that Sir Richard Redmayne (Chairman of the Coal Organization Committee) suggested, a short time since, should be taken to increase the supplies of coal with the existing available labour, it will be remembered a joint conference of employers and miners only adopted the one which proposed the attempted elimination of avoidable absenteeism. In accordance with this resolve, local joint committees were appointed to inquire into absenteeism, and the means of reducing it. The Committees have set to work with right good will; but at a meeting on Thursday last, of the Joint Committee of Employers and Workmen in the Coal Industry, it was stated that it was too early yet for definite reports to be made from the various districts The satisfactory intelligence was given, however, that both employers and workmen were taking up the question in a practical way, and that excellent results had already been achieved. It is estimated that the elimination of avoidable absenteeism from the pits would increase the coal supply by 10 million tons per annum.

A Far-Reaching Economic Bond.

If the recommendations that resulted from the Economic Conference of the Allies in Paris last week are unanimously accepted by the Governments of all the allied countries and put into force, the preparations that are being made by the Central Powers for an intense after-war contest on the economic plane will be properly met, the economic independence of the markets of all neutral countries will be assured, the economic bonds between the Allies will be of a permanent character, and their interests will be solidified, while enemy countries will find that, in this protracted war, they have been working with good result towards the end of killing, instead of improving, their commercial position in the world. The recommendations as to measures are far-reaching—whether regarded from the point of view of the war period, from that of the period of the commercial industrial, agricultural, and maritime reconstruction of the allied countries, or from that of permanent and mutual assistance and collaboration. The recommendations have been published far and wide; and we imagine that, if they have penetrated into enemy countries, they have made the conspirators for a world-wide Teutonic trade supremacy feel that their plans have a tottering foundation. We will not refer to all the constituents of the extensive range of plans. But among the proposals, we are interested in those for the conservation for the allied countries before all others of their natural resources, for preventing enemy subjects from exercising in the territories of the Allies certain industries or professions which concern national defence or economic independence, for rendering (this is especially important to the gas industry) this country independent of enemy countries so far as regards raw materials and manufactured articles essential to the normal development of their economic activities, for rendering financial assistance to scientific and technical research, for increasing production in the allied countries, and for assimilating the patent laws.

The War and Consulting Engineers.

All are suffering more or less from the war—some more than others; but, in such times as these, private interests must be subordinated to national ones. Those consulting engineers who have banded themselves together for mutual support and protection, under the title of the "Association of Consulting Engineers," and after the manner of trade unionists, have apparently divided opinions on the subject of the subordination of their interests. The late Chairman of the Association (Mr. G. Midgley Taylor, M.Inst.C.E.) is one of those who take a broad view of the matter. No one can doubt that consulting engineers who have not more than one string to their bow have felt acutely the war limitation of municipal and company borrowings for new and extension works and renewals. The point was made at the recent annual meeting of the Association. Mr. Midgley Taylor then said that, though no loyal member wished to grumble (because where the interests of the country were at stake, and the best means of carrying on the war had to be considered, their private interests must stand aside), still the refusal of municipal borrowings had had a great effect on the consulting profession generally. Notwithstanding this acknowledgment as to the supremacy of national interests, it is gathered from the report of the Committee that the Association so far considered the personal interests of the members as to send a deputation to the Board of Trade to point out "the serious effect on consulting engineers' practice of the Treasury's minute restricting the borrowing powers of local authorities in connection with new schemes, and to suggest certain ways in which this could be mitigated." If we all worried the Board of Trade or any other Government department with the effects of the war upon our personal interests, and with our views as to the ways in which the effects could be mitigated, our bureaucratic system of government would break down under the awful burden. There are many ways in which the material interests of technical journals have been affected by the war—not only through the refusal of borrowings and new issues of capital, but through engineering and other establishments having had their normal work supplanted by the production of munitions, and through the higher cost of paper, postage, &c. But one way in which we can all show loyalty in these times is by giving the powers that be as little worry as possible. Up to the present, we have not heard that the Treasury have relaxed their control over municipal borrowings in view of the Association having been to the Board of Trade.

Municipal Officials and Consulting Work.

In another direction, the Association has been taking up the *rôle* of protectionists. It makes all the difference whether an engineer is in official service, or whether he is a consultant, as to his views on the subject of officials engaging in outside professional work. Some consulting engineers—probably some of the members of the Association—have never had the practical experience of an official engineer, and yet such experience is absolutely necessary to the making of a finished consultant. But those of the members who have been in official service, but have since, by self-election, become consulting engineers, have, with the transfer of their abilities from the one sphere to the other, completely changed their views as to the propriety of official engineers being allowed to undertake professional work outside their own salaried duties. When these members were themselves officials, they were no doubt pleased enough to engage in outside professional work; but now —— well, it is a very wrong thing in their sight that there should be this trespass by officials upon the consultant's ground. As we have said before, there are consultants and consultants; and there are official engineers whose advice we should much prefer on certain special matters, especially with their local knowledge, to that of some consulting engineers. Mr. Midgley Taylor was careful to make it clear that he for one did not assail the competence of official engineers to advise. It was discreet on his part to make this acknowledgment. But he added that it seemed to him that the time of the official

engineer should be fully occupied in carrying out his own special work. This is not a safe rule for general application. Its applicability depends on the man and his circumstances. However, protests have been sent to local authorities. For instance, they have remonstrated with the Electricity Committee of the Manchester Corporation for allowing their Engineer (Mr. S. L. Pearce) to advise the boroughs of Rochdale, Chesterfield, and Stafford with regard to proposed extensions of their electricity works. Similar action was taken when it was learned that the City Engineer of Liverpool had been permitted to advise the borough of Wigan. But the Corporation of Aberdeen have received a message of gratification from the Association for their action in declining to allow their Water Engineer to advise an outside authority. However, it does not appear that where protests have been lodged they have had the desired effect.

Trade with New Zealand.

Everyone on this side knows the reasons which at present prevent British manufacturers as a body from securing that share of business in New Zealand to which they have been accustomed; and these disabilities are, while prevailing conditions endure, impossible of removal. That the future effects of this regrettable condition of things may, however, be mitigated is the opinion of Mr. Wickham, who has occupied the position of Trade Commissioner in the Colony; and he indicates the steps which should be taken to this end. The principal fact to be borne in mind is, of course, that importers have perforce opened up business relations with new suppliers, and have at least temporarily severed old connections; and this means that the leeway which will have to be made up after the war, before British manufacturers can get back even to their pre-war share of the trade in the Dominion, will be serious. Mr. Wickham's first suggestion for minimizing this difficulty is that those firms who are occupied entirely with munition making, and thus are absolutely precluded from exporting, should as far as possible make this fact known to their customers in New Zealand—not only to importers, but to consumers. In the next place, those whose goods are still available, but whose prices are seriously enhanced, should take care to give ample explanation of the reasons. In his final suggestion, Mr. Wickham shows how well he understands the methods of modern business. He says that "all firms who are partly or entirely cut off from their market must realize that, if they wish to save themselves future effort, they must spend more, rather than less, in keeping their name before the public by way of advertisement." One cannot help feeling that, by carefully noting these suggestions, and then vigorously acting upon them, British manufacturers will do much to smooth their path, when they are again in a position to carry through any business they are able to secure.

Defence of the Realm Regulations.

There has been some difficulty in following the various new and amended war emergency regulations as they have come along; and therefore it is a good idea that they should be reproduced in consolidated form, in a "Manual of Emergency Legislation." This has been done in respect of the Defence of the Realm Regulations; the second edition of the volume embracing the regulations made up to May 23 last. The compilation (which is published by authority) is edited by Mr. Alexander Pulling, C.B., Barrister-at-Law; and it is arranged with notes and a table of the different points dealt with in the regulations. The main portion of the work is the consolidation into one code of the Defence of the Realm Regulations of November, 1914, and the twenty-three Orders in Council subsequently issued. Under powers contained in the regulations, various orders have been made by the Admiralty, the Army Council, the Minister of Munitions, the Secretary of State, and the Secretary for Scotland. The full text of those orders which are of a general character is given in appendices; while local orders are referred to in footnotes to the empowering regulation. The orders as to lights are reproduced.

Gas-Fired Incubators and Breeders.—The June "Bulletin of the American Commercial Gas Association" quotes the "Baltimore Gas and Electric News" to the effect that hatching chickens by the use of artificial gas is successfully carried on at Chestnut Hill farm, North Bend, Catonsville. The oil-lamps have been discarded for heating the incubators, and gas-burners substituted. An even distribution of heat is maintained; and there is no trimming of wicks, no smoking of chimneys, no danger of the fuel supply running out. Dr. J. Charles Macgill, at his chicken farm in Catonsville, uses a gas-heated brooder to keep the little chicks warm after hatching; and "the young birds hover under the gas-heated artificial wing of their automatically regulated mother."

OBITUARY.

MRS. JOHN W. MORRISON.

We greatly regret to learn of the death of Mrs. Morrison (the wife of Mr. Jno. W. Morrison, of Sheffield), which took place at her residence on Saturday last, June 24, at the comparatively early age of fifty years.

The deceased lady has been an invalid for six months, after undergoing a serious operation in January, when it was found she was suffering from an incurable malady. Mrs. Morrison always interested herself greatly in the welfare and recreations of the workmen in her husband's employ, both in Sheffield and at Saltley, Birmingham. She was a staunch supporter of the Conservative cause; for the past five years being Dame President of the Central Sheffield Habitation of the Primrose League. Mrs. Morrison was a regular attendant at the annual meetings of the Gas Institution, and her genial presence will be missed by a large circle of friends.

Much sympathy will be felt with Mr. Herbert Lees, the Engineer and Secretary of the Hexham Gas Company, who last Tuesday received the sad news that his elder son, Second-Lieutenant Frank P. Lees (who, it will be remembered, was present at the meeting of the Institution of Gas Engineers three weeks ago), had been killed in action on the 17th inst. Letters which his father has received from brother officers show how greatly Lieutenant Lees' good qualities were appreciated, and how keenly he will be missed. Lieutenant-Colonel B. D. Gibson, writing on June 17, says: "I was in the same trench as your son when he was hit, and was with him till a few minutes before he died, about two hours afterwards, on the way from the regimental aid post to the field ambulance. He was conscious all the time, and realized that he was seriously wounded, asking us to remember him to you all. I shall feel his loss in many ways almost more than I can tell you. He was one of my best officers, and was beloved and admired by officers and men alike. His gallantry under fire, devotion to duty, and exemplary conduct at all times were typical of the true Christian soldier he always showed himself to be. He was buried this evening in the military cemetery behind our trenches." Lieutenant Lees (who was only 26 years of age) received his initial training under his father at Hexham. He then spent some time as Junior Chemist at Preston, which was followed by a short course at the Leeds University. Subsequently he was engaged as Clerk of Works on high-pressure main extensions at Barnard Castle and Wolverhampton. When war broke out, he was in the service of West's Gas Improvement Company, superintending the erection of a vertical retort installation at Darlington. Early in September, 1914, he enlisted as a private in the 16th Northumberland Fusiliers, and in April of the following year received his commission with the 4th Battalion of the same regiment. He went out to France in July of last year; and, after being home on leave, returned there on the 7th inst.

PERSONAL.

Mr. Henry Woodall, J.P., M.Inst.C.E., was last Wednesday appointed a Director of the British Gas Light Company, Limited, to fill the vacancy on the Board caused by the death of his father, Sir Corbet Woodall.

The last issue of "Het Gas" contains a long appreciation of the late Sir Corbet Woodall, together with his portrait. It states that the deceased gas engineer was not only famous in the United Kingdom, but also on the Continent, where his skill was highly appreciated. The Dutch Gas Association in 1913 appointed Sir Corbet an honorary member.

In General Sir Douglas Haig's list of officers who have displayed gallant and distinguished conduct in the field, published on the 15th inst., appears the name of the late Second Lieutenant C. V. Townsend, of the 7th King's Shropshire Light Infantry, Engineer and Manager of the Hereford Corporation Gas-Works, who was killed in action in France on March 21 last, as recorded in our columns at the time.

Flight-Lieutenant Frederick G. D. Hards, R.N.A.S., who in normal times is employed at the head office of the James Keith and Blackman Company, has, we are glad to learn, received the D.S.C. for his services on the morning of April 25, when he pursued a Zeppelin 65 miles out to sea, dived to within a few hundred feet of it, and attacked it with bombs and darts.

Mr. J. W. Thompson, the Manager of the Barnoldswick Urban District Council gas-works, has been appointed to a similar position at Ripon. There were forty applicants for the post.

Mr. William Brown, who has been appointed Gas Manager to the Burntisland Town Council, in place of the late Mr. Alexander Ross, has been Manager at Cardenden for the past seven years, and previous to that was at Lasswade. There were close upon fifty applicants for the Burntisland vacancy.

The marriage has taken place of Captain Alan Bodman and Miss Clare Forbes Irving, younger daughter of Mr. and Mrs. Daniel Irving, of Bristol. The ceremony was performed by the Rev. David Irving, M.A., D.C.L., uncle of the bride, assisted by the Minister of Redland Grove Church, where the marriage was

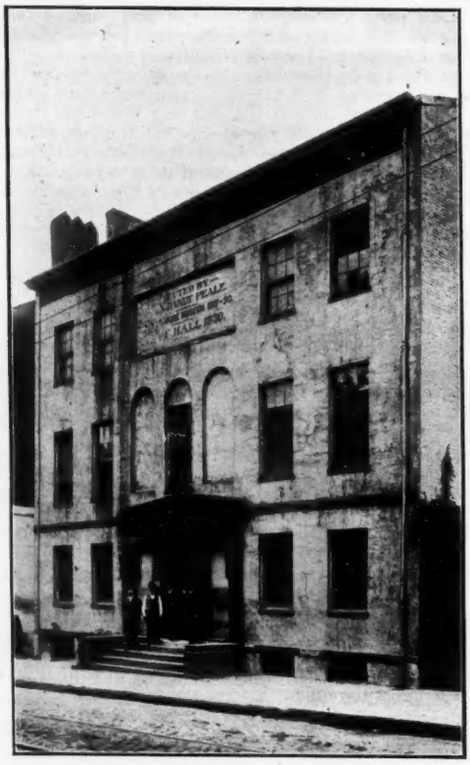
solemnized. The bride's younger brother, Lieutenant Roy Irving, of the Royal Engineers, acted as principal usher; her elder brother, Lieutenant Douglas Irving, of the Somerset Light Infantry, being on active service in Burmah.

At a meeting last week of the Directors of the Coatbridge Gas Company, Mr. GEORGE BRAIDWOOD was appointed Engineer and Manager, to succeed Mr. Thomas Wilson, who recently retired after thirty years' service. Mr. Braidwood, who has been six years Assistant Manager at Coatbridge, began his training in the Glasgow Corporation Gas Department, under Mr. Alexander Wilson, at the Dawsholm and Temple works. When at the Temple works he carried out many of the experiments in connection with the Wilson system of continuous intermittent vertical retorts. He is well known to the younger members of the profession in the West of Scotland, having been Secretary for a number of years of the Western District of the Scottish Junior Gas Association.

AMERICAN GAS CENTENARY.

CORRESPONDENCE which came to hand during the past week, indicated the nature of the elaborate preparations that were made for the celebration in Baltimore on the 16th and 17th inst. of the American Gas Centenary—an article dealing with which was published in last week's "JOURNAL" [p. 657], while another from the "American Gas Light Journal" is reproduced on p. 697 of this issue.

The Johns Hopkins University assumed charge of one of the principal features, which was a meeting in the M'Coy Hall—the University's scholastic forum—at which prominent officials of the State and Municipal governments, distinguished engineers, and men in the forefront of the gas industry from all parts of the country, were invited to be present. Over this assembly, Dr. Frank J. Goodnow, the President of the University, had promised to preside. For other events on the programme, the Consolidated Gas, Electric Light, and Power Company were to be sponsors.



First American Public Building Lighted by Gas.

The accompanying photograph is of Peale's Museum, Baltimore, which was the first public building in America to be lighted with gas.

Association of British Chemical Manufacturers.—The definite formation of the Association of British Chemical Manufacturers was accomplished at a meeting held last week in the rooms of the Chemical Society. The Provisional Committee includes Mr. Charles Carpenter, D.Sc., Mr. Norman Holden, Sir Alfred Mond, M.P., and Sir William Pearce, M.P. Among the main objects of the Association are to promote co-operation between British chemical manufacturers, to act as a medium for placing before the Government views of the manufacturers upon vital questions, and to generally promote the welfare of our chemical industries.

ORGANIZATION OF THE GAS INDUSTRY.

THE following notification has been received for publication, from Mr. W. E. Price, the Honorary Secretary of the National Gas Committee.

A conference of the Councils of the Institution of Gas Engineers and the Society of British Gas Industries, the General Committee of the British Commercial Gas Association, and the Committee of the Gas Companies' Protection Association was held at the Westminster Palace Hotel on Wednesday, the 21st of June, to consider the question of organization of the gas industry. There was a large and representative attendance.

After a general discussion of the subject, the principle of co-ordination was approved; and it was agreed to refer the matter to a Committee composed of seven representatives from each of the above-mentioned bodies, for further consideration and report.

AN OUTLINE SCHEME FOR A CENTRAL GAS ORGANIZATION.

ALTHOUGH there has not been any definite step taken yet—conference notwithstanding—in the matter of the establishment of a central and effective organization completely representative of the gas industry, we have arrived at the admission that such an organization is much needed. It has been a slow process to get to this point, but it is something gained. As mentioned in the first of the series of articles on the subject that have appeared in our columns recently, it was on July 20, 1909, that the original article was published in the "JOURNAL" urging the promotion of a wholly representative organization; and there has been intermittent revival of the question until just lately, when scarcely a week has passed without some reference being made to it. The whole question now resolves itself—the matter having been taken in hand by the various existing organizations—into one of a satisfactory scheme. Nearly a fortnight ago, the question was put to us in a private letter as to what, after the long consideration given to the matter, we should deem a fairly representative organization for the industry; and a reply to the inquiry was forwarded on June 17 to our correspondent, who is a gentleman who has taken a large part in the discussion of the question.

It may be of interest at this juncture to place on record the main parts of the letter sketching the scheme. After references to more or less personal matters, allusion was first made to the

NATIONAL GAS COUNCIL.

In the first place, it seems to me that the National Gas Council that it is proposed to elect will not be fully representative of the interests of the gas industry. The election of the representatives on that Council will be in the hands of the organizations now in existence, and not in the hands of the gas industry as a whole, a large part of which is totally unrepresented by these organizations, except through their officials.

Nothing sufficient has hitherto been done to bring into active, co-operative work a large number of administrators of undertakings who have to determine the policy, and deal with the finances, of these undertakings. It is such men who have not hitherto been attracted who must be attracted if full and effective work is to be done in connection with the gas industry.

The existing organizations are not, I say, entirely representative of the industry. You have—

(1) The Institution of Gas Engineers, the members of which are solely engineers. Administrators and officials, such as secretaries and the chiefs of sales departments, are ineligible for membership, though all so important in connection with the successful running of the gas industry.

(2) The British Commercial Gas Association. On the General Council you have financial, administrative, commercial, engineering, and manufacturing interests represented; but only finance and administration so far as gas undertakings are subscribers to the Association. Comparatively few (though the most important) municipal gas undertakings are represented, and hardly any district council concerns.

(3) The Society of British Gas Industries, representing manufacturing interests only.

(4) The Gas Companies' Protection Association. Only gas companies who are subscribers are represented; so that gas companies who are not subscribers, municipal gas undertakings, and district council gas concerns are unrepresented.

This is a curious collection of organized bodies from which to elect a thoroughly representative National Gas Council. These bodies are not fully representative of the industry; and I cannot see that the National Gas Council will have the right to speak authoritatively for the entire industry, but only the right to speak authoritatively for the existing organizations.

I take it, too, that the National Gas Council (as proposed) would be a body whose powers would come under the survey and

veto of the different bodies who elected them. If this be so, all the old delay, all the old bickerings, and much else (which it is desired to get rid of) would arise in intensified form.

CONSTITUTION AND WORK OF THE CENTRAL ORGANIZATION.

What I think is ultimately wanted is a central organization constituted of—

(1) Administrators of gas undertakings representing finance, policy, and commercial work.
(2) Gas engineers.
(3) Secretaries.
(4) Gas accountants.
(5) Chief executive officers dealing with the distribution systems and sales departments of gas undertakings.
(6) Gas chemists.
(7) Principals (and only principals) of manufacturing firms.

This should be the central organization of the gas industry; and its Council should be predominant in the general work and policy of the industry.

Annual meetings should be held, at which all matters relating to policy, trading, gas-consuming apparatus, accounts, and legislative and legal questions could be discussed.

Gas engineers (in addition to their membership of the central organization) could continue to have their separate organization for the consideration and discussion of engineering and technical matters relating to works' construction and gas and residuals manufacture and gas distribution. They, too, should be the body responsible for carrying out research work for the industry. The finance for this research work should be voted by the industry's central organization.

A section of the central organization could deal with (having the present staff organization handed over for the purpose) the work carried on by the British Commercial Gas Association.

A department, too, could take over a large part of the work, under direction with legal and parliamentary experience, now dealt with by the Gas Companies' Protection Association.

The new central organization should also be the financial organization of the gas industry for the purpose of collecting funds and allocating them for different purposes of common or of general importance—viz.,

(1) Publicity.
(2) Research.
(3) For promoting and defending the interests of the gas industry in Parliament and, if nccessary, in the Law Courts.
(4) If thought proper, the Benevolent Fund of the Institution of Gas Engineers could also be taken over.

Only by an ambitious scheme of the kind shall we be able to get a properly representative organization—powerful and influential in the work of the industry, acceptable to Government Departments, and recognized by the other technical bodies from whom such an organization would command respect and consideration, which has not been the case, and is not always so at the present time.

This is only a crude idea of what is in my mind; and it will bear a lot of developing and shaping-up.

These are the main parts of the communication sketching in maybe somewhat crude form the constitution, work, and position of a central and premier organization—an organization in which all the effective forces of the industry should be gathered. Opportunities have not been afforded for bringing all these forces into actual contact with the general work of the industry; and there must be such contact, at general meetings, by conference, by intermingling, in order to gain sympathy and support. We want more business brains and more men of influence working in the cause of the gas industry; and, with the incoming of such men—representing policy, administration, and finance—once and for all we shall have the work of the industry put upon a sounder foundation than hitherto, and not suffering from that incapacity and enervation which come from divided forces and penuriousness. The most heart-breaking pieces of work ever witnessed in this great gas industry have been the collection of funds for special work of common importance. The maxima in slowness and inadequacy of response have been witnessed, and have been enough to destroy all energy in working for the common good. The most successful effort has been the financing of the work of the British Commercial Gas Association. Why? Because those responsible for policy, administration, and finance have been brought into personal contact with the work. There is a lesson here. The financing of the general work of the industry is as important as its capital expenditure. As time passes, the questions increase that have for the industry universal significance, weight, and effect.

Woodall-Duckham Verticals in America.—The Directors of the Meriden (Conn.) Gas Company have decided upon the erection of a continuous vertical retort plant of the Woodall-Duckham type, of a total capacity of 750,000 cubic feet per 24 hours; and the contract for the plant has been given to the Isbell-Porter Company, of Newark, N.J. The plant named was chosen after a careful inspection of different types, both in America and abroad, by the General Manager (Mr. Charles A. Learned); it being considered that it would best meet the particular needs of the Company.

ELECTRICITY SUPPLY MEMORANDA.

THERE is not the slightest doubt that the addition to consumers' accounts by electricity concerns of a percentage to compensate for increased costs due to the war, has been a huge mistake. They had better have made an addition to the price per unit; this being the method that is best appreciated by the ordinary consumer. In London and other places, consumers at first objected to the extra charge—one of the grounds of opposition being that, unlike the gas companies, the electricity companies were not working under a sliding-scale which assures that, when prices are increased, the shareholders will suffer a statutorily fixed diminution of their dividends. However, some of the electricity companies, without the application of the sliding-scale, have had to lower their dividends; but the reductions have not been uniform—there is nothing compulsory about them save an absolute shortage of money with which to pay the dividends. Since the first protest, the percentage addition to electricity accounts in most cases has been raised to 20, and, in not a few instances, to 25. There is strong resentment against the additional percentage. The first 10 per cent. upon the accounts appeared to be fairly substantial; and it seems to have been thought by consumers that it would have covered all war contingencies. But now that the percentage addition has got up to 20 and 25, this is looked upon as outrageous, especially as it is clear that the dividends are not going to be allowed to diminish in any proportionate degree. Mr. H. R. Beeton, the Chairman of the Brompton and Kensington Electric Supply Company, says, in a letter to the "Times" (in which there has been an amount of correspondence on the subject of electricity price advances), that it is surely not unreasonable to put up the charge for electricity 20 per cent. when coal has advanced 100 per cent. But coal is not the only thing embraced in the charge per unit; and the percentage addition the consumers have to pay is upon the total charge. Consumers perhaps do not know that in 1915—a war year—the fuel costs of the Brompton and Kensington Company amounted to 0·72d. per unit; and this was the highest coal cost of all the Metropolitan undertakings. Even the high fuel cost per unit is a comparatively small part of the price charged for lighting units. The electricity undertakings have also made bad moves in tactics in ascribing part of the increase to, and especially in insisting upon the minimum charge in consequence of, the Daylight Saving Act. The protesting consumers naturally say: "Here we are asked by the Legislature to go to bed one hour earlier; and, when there is compliance, we are fined for so doing by the electricity suppliers charging us either more for our electric current or, if our consumption falls below the minimum amount per quarter, charging us the minimum sum. And they do this by the consent of the law." The contrarieties of legislation are beyond the understanding of the lay mind. Mr. Beeton also appeals to the common sense of the consumers by pointing to the fact that, as the consumption diminishes, so the average of the capital and standing charges per unit increases. But Mr. Beeton is illogical when, after showing that anything which reduces consumption increases the average costs per unit, he goes on to claim that, by advancing the price, the companies are doing the best possible to cause consumers to reduce their demand for current, and so are complying with the exhortation of the Board of Trade to do something to reduce by 10 per cent. the consumption of coal used for lighting. It seems altogether an abuse of economic principles to put up the price of a commodity with the view to reducing its consumption when the lower consumption means greater outlay per unit of output.

Consumers and Increased Charges.

Directors' Profit Sharing.

"The Times" is rather sympathetic with the consumers over the electricity advances; and in commenting upon the matter, it certainly makes a point of which Mr. Beeton and his directorial colleagues of the Brompton and Kensington Company will not approve. Our morning contemporary points out that of the London electricity companies, the Brompton and Kensington is the only one, apart from the Notting Hill undertaking, that paid so much as 10 per cent. last year—a rate it has steadily maintained since 1903. But the complaining consumers will be interested in this revelation by "The Times:" "It cannot escape observation that its Directors—at present four in number, including the Chairman—share the not insignificant sum of £1500 annually as fees, and in addition are entitled to one-tenth of the balance of profits after a dividend of 7 per cent. has been paid and provision made for depreciation. Similar arrangements for profit-sharing by Directors exist in the case of some of the other companies; but their desirability may be questioned for 'public utility' companies which enjoy a monopoly for the supply of a necessary such as electric power."

More Petty Evasion.

The "Station Engineer," whose contribution to the "Electrical Times" on the subject of the relative costs of gas and electricity was the subject of comment in the "Memoranda" last week, suffers badly from that common electrical habit, of employing subterfuge when challenged to deal with certain statements. It will be remembered that this "Station Engineer," in dealing

with the British Commercial Gas Association's claim that gas is much cheaper than electricity for a given amount of illuminating power, using respectively inverted gas-burners and metallic filament electric-lamps, urged the unsoundness of the figures by reference to the electric revenue account instead of to the readings of photometer and meters. These instruments are things that are most carefully avoided by electricians when discussing the question of relative costs, as the illumination basis is not to their liking. They prefer to appeal to matters that are altogether removed from those instruments—such as consumers' accounts, considerately ignoring the fact that gas is mostly used at lighting rates for so many purposes other than illumination, or, as in the case of this "Station Engineer," to the electricity revenue account, adopting in his computation the arbitrary figure of £4 as an average per annum for gas consumers' accounts, which £4 he attributes entirely to lighting. In the "Electrical Times," Mr. W. M. Mason, the Secretary of the British Commercial Gas Association, attacks the "starting hypothesis" of £4. He writes: "From 50 to 70 per cent. of the gas consumers in most towns are those using slot meters. The average collection from those meters in towns where gas is in the neighbourhood of 2s. 6d. per 1000 cubic feet is about 50s. per annum, of which (say) 10s. is for hire of installation, and only one-half, or thereabouts, of the balance is for light, the rest being for fuel. So, for the great bulk of lighting consumers, 'Station Engineer's' £4 becomes £1; and his pretty little edifice tumbles down. Very few people—and 'Station Engineer' is obviously not one of the few—realize how very small is the cost of lighting by modern incandescent burners, and what a very large proportion of most gas accounts in houses where it is used throughout for lighting is in reality for cooking and heating." "Station Engineer" has not replied directly to Mr. Mason's letter; but he again has recourse to the art of evasion by writing through the Editor of the "Electrical Times." He refers to the statement as to slot meters, and says that there are quite a number of large towns where there are 2000 electricity consumers "whose gas bills would be over £4 per annum." See the finesse again. There is careful omission of "for lighting" after the word "bills." Then he sidles once more from the main point: "Harrods, Whiteleys, and a few others would save thousands a year by using gas. Then why don't they use it? The gas is clean, healthy, and kills germs, so the gas people say, and far better in every way than electricity. Perhaps their preference for electric light shows lack of commercial acumen! Evidently something or other is amiss. Can it possibly be in the 'B.C.G.A.' pamphlet?" Now, Mr. "Station Engineer," will you come into contact with the photometer and the meter?

The Picture from the Other Side.

Mr. Mason gives "Station Engineer" another smashing blow, to which he also avoids public allusion. It shows what excellent work the electrical people are doing for gas by entering into the cooking and heating business. We ought to be thankful to them for this, and not upbraid them; for the poor things are struggling hard with adversity in the shape of dearly realized and purveyed B.Th.U. Mr. Mason does not upbraid, nor does he sympathize. But he states the experience of an electricity consumer with callous indifference to the wounds he will inflict upon those who, with their tongues in their cheeks, preach the gospel of domestic fuel economy *viâ* the electricity generating station. This is what he says: "I have had given me the figures for a flat where three electric radiators and an electric cooker are (or rather were) used, in addition to electricity for lighting. For one quarter, with current at ¾d. per unit, the bill came to £22; this being in addition to an annual charge under the 'telephone system' of £9. This only confirms other experiences in the same district, where a 'smart' sales manager is making quite a reputation for electricity as a fuel—to the no small advantage of the gas company." In the tail of this statement of domestic experience, there is a nasty sting; but "Station Engineer" was too cute to be drawn by it. He knows something about which he feels it is not his business to blab.

A Combined Gas and Electric Cooker.

In the same number of the "Electrical Times," there is an admission that electricity cannot compete with gas for the heating of liquids, or, at all events, cannot until electricity is at a flat-rate of ½d. per unit and the radiant boiling disc is an accomplished fact. Then, and not till then, will "most"—not all—of the troubles to which the enclosed form of disc is subject be eliminated, and, at the flat-rate of ½d. per unit, will it be possible "in most districts successfully to compete with gas on cost alone." This assertion can be challenged with ease and confidence; but it need not be pursued until the conditions necessary to its accomplishment have actually materialized. Apart from the impossibility that existed prior to the war of electricity competing with gas for heating liquids in bulk or small quantities and in quick time ("time is money") the conditions are being further altered by the war, by gas-works being relieved of the illuminating power standard for gas burned as open flames, and by entering largely into the business of the production of benzol and other commodities, and so becoming one of the two important feeders of the dye-using and other industries and the providers of motor car fuel. Both the electricity and the gas industries will suffer from heavy costs after the war; but the industry that can put its raw material to the most profitable use will stand well in the competition in respect of its primary commodity. However, the acknowledgment of our contemporary as to electricity being unable at present to compete with gas for the boiling of liquids—it has shown some strong reticence in previously admitting the fact—has been drawn by the Westinghouse Electric and Manufacturing Company of Pittsburg, conceding the same thing by producing an electric-gas cooker, in which electricity is used for the oven and grill, and gas-rings are fitted to the top plate—an electric gas-lighter being used for the latter. The comment of the "Electrical Times" is: "We are glad to see that one of the largest and most respected electrical manufacturers in America has faced what we believe to be—at least in this country—a temporary position, and has introduced an electric cooker with gas-heated boiling-table, and has thus anticipated any movement by the gas interests to supply a gas-cooker equipped with electrically heated ovens and grill." Our contemporary may rest assured that, with 6 cubic feet of gas as the thermal equivalent of a unit of electricity, the gas interests are not likely to seek the development of the gas-cooker on the lines suggested. Householders will not be very partial to having two accounts running for the heating of their cookers. In America, however, it does not matter so much where gas and electricity are so often supplied by the same concern. Our contemporary is wise in its advice that "the electric cooking industry will develop the more surely if its advocates do not claim results in connection with the boiling of liquids that cannot be justified in practice."

SIXTY YEARS AGO.

From the "Journal" of June, 1856.

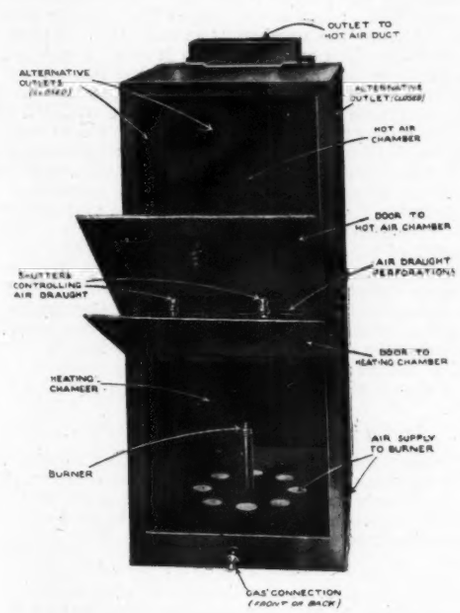
Purification by Oxide of Iron.—Our readers have, no doubt, noticed that an active controversy is in progress with respect to the primary honour and legal right of using oxide of iron in the purification of gas. The subject was long ago fully discussed in our columns; and nothing has since transpired which sensibly affects the conclusions then arrived at. Those conclusions assigned to Mr. Croll the merit of first employing oxide of iron; while to Messrs. F. J. Evans and Laming it awarded the discovery of the process of revivification, which alone gives practical value to the invention of Mr. Croll. It would appear, however, that this simple view of the case is by no means satisfactory to all parties. Therefore we willingly resume the whole question, by giving a brief outline of the facts as they stand recorded. On July 29, 1840, Mr. Croll took out the first patent for purifying gas by means of certain metallic oxides. Under this patent, he claimed the use of the oxide of manganese, the oxides of iron, and the oxide of zinc; but he claimed them only when used in the manner and in the particular stage of the operation described, and not otherwise. Now this manner and stage were in a dry-lime purifier, damped as lime is damped, and after the removal of the ammonia. This unfortunate disclaimer (for such it really was) did not escape the legal acumen of Mr. Laming, who thereupon took out his patent for the use of "oxide of iron, manganese, and zinc, mixed with chloride of calcium," or some similar agent, by which the gas could be freed at once from its ammonia and sulphuretted hydrogen, without requiring a succession of vessels. In this way, he hoped to evade Croll's patent, and probably in a legal sense did so, in consequence of the remarkable disclaimer above alluded to. This mixture was tried at the Westminster station of the Chartered Gas-Works, and found to answer. . . . Mr. Hills, on Nov. 28, 1849, took out a patent "for compressing peat for making fuel or gas, and of manufacturing gas, and of obtaining certain substances applicable to purifying the same." In the title there is not one word about any improvement in purifying gas, but only for manufacturing gas, and obtaining certain substances for purifying the same. Upon the title alone, therefore, this cannot include an improvement in "purifying," but only in "obtaining;" nor does the deposit-paper, which ought more fully and clearly to explain the real nature of the invention, mention oxide of iron. . . . If, however, the words oxide of iron had even been mentioned in the deposit-paper, the prior claim of Mr. Croll would necessarily have invalidated any title to its use, except with respect to any improvement. Admitting that the mixing of chloride of calcium, as proposed by Mr. Laming, and of sawdust, as proposed by Mr. Hills, with the oxide of iron, were really improvements upon Croll's invention, these improvements could give no right, and still less an exclusive right, to the employment of oxide of iron alone, or combined with other agents not mentioned by any of the patentees. . . . Several of the gas companies in the country are using oxide of iron in various forms of combination, without the most remote idea that any infringement of any patent-right takes place; while others are quietly paying royalties to one or other of the two claimants, under an impression that patent-rights do exist. It seems to us a question of this importance requires a speedy decision, in accordance with the dictates of justice.

Dutch Association of Gas Managers.—The forty-fourth annual meeting of the Association will be held at Amsterdam, in the building of the Industrial Club, on July 11 and 12. For the afternoon of the second day, a visit to the Municipal Southern Gas-Works is on the programme. Particulars regarding the papers to be read and the other details of the programme are to be published in a special number of "Het Gas."

HEATING AND VENTILATING ORGANS.

A NEW use for gas, which, though the consumption in each individual case might not amount to a very great deal, is well worth cultivating, and is besides of a particularly interesting nature, was referred to in the "JOURNAL" some months ago, when an apparatus was described which was then being successfully experimented with, for the purpose of preserving church and other organs from the effects of wide variations of temperature and of damp. It was then stated that the apparatus—made by the Davis Gas-Stove Company, Limited—had achieved the desired result throughout a particularly damp autumn and winter. The patented appliance has now been perfected; and the firm are in a position to supply it for attachment either inside or outside the casings of the numberless valuable instruments that should be benefited by it. Something of the kind has, we are assured, long been wanted; so that it is only natural a career of usefulness should be anticipated for this novel arrangement.

The object of the Davis organ heater and ventilator is to overcome the troubles referred to by furnishing to the internal working parts of the instrument a constant stream of warmed air, and thus to maintain the temperature and the atmospheric condition at the most suitable points. The construction of the apparatus is indicated by the accompanying explanatory illustration. The sheet-iron casing is only 2 feet high; and, finished in black enamel, it is quite neat in appearance. There are, as will be seen, two separate chambers, which are divided by a thin plate; and in the lower one is a small atmospheric burner, surrounded by the necessary air-holes. The other chamber is provided with a series of air-draught holes, which can be regulated so as to prevent the passage through the apparatus of an excessive amount of air.



Explanatory Diagram of the Davis Organ Heater.

On lighting the burner, the dividing-plate and upper chamber become rapidly heated; and there ensues an upward movement of the heated air inside, which passes from the outlet through a duct to the interior of the organ. Fresh air is thus drawn in through the perforations in the door of the upper chamber; and this air, in turn, is warmed while passing to the outlet. The heated air is introduced into the organ at any convenient point, and dispersed by a spreader, so as to ensure its effective distribution. The makers emphasize the fact that, by reason of the complete separation of the burner-box from the air-chamber, the warmed air cannot fail to enter the organ by way of the duct; while the products of combustion, which are practically negligible in quantity, pass away through independent side outlets provided for the purpose. Thus the apparatus can be used with perfect confidence and safety.

As to cost of maintenance, it is only necessary to point to the obvious simplicity of the apparatus; and on the question of working charges, it may be mentioned that the burner fitted can be adjusted to consume anything from 3 to 6 cubic feet of gas per hour. Taking the mean rate of 4½ cubic feet per hour, and assuming continuous use for six months out of the twelve, the cost, with gas at 3s. per 1000 cubic feet, comes out at 59s. per annum; while at 3½ cubic feet per hour—a consumption which has been found to give very satisfactory results—the cost would be reduced to 46s. a year. Either sum is little enough to pay for the preservation of so valuable and delicate an instrument as an organ.

MIDLAND JUNIOR GAS ASSOCIATION.

A General Meeting of the Association—the second one arranged for the session 1915-16—was held on Saturday afternoon, at the Municipal Technical School, Birmingham. Mr. F. J. WARD, of Knowle (the President), occupied the chair. An attractive programme had been arranged at short notice by the Honorary Secretary (Mr. W. J. Pickering, of Birmingham); but unfortunately the attendance of members was small.

PRESIDENT'S OPENING REMARKS.

The PRESIDENT, in a few opening remarks, said that since the members last met they had passed through some very troubled and unsettled times. Following the enemy air raid in the Midlands, the order bringing the drastic lighting restrictions into force wrought havoc with the gas sales—more especially in residential districts such as his own, where the immediate result was a reduction of 15 per cent. in sales. The continued economical—not to say parsimonious—use of gas by consumers made it difficult, too, to recover any of the lost ground. Then the Summer Time Act had caused for the time being a further reduction of 10 per cent., and would probably account for 5 per cent. over the whole year. No doubt, the Act had its advantages in the case of town dwellers; but the benefits were very indistinct to country people. The Act had, however, in all probability come to stay; and they would have to look for business in other directions than lighting to make good the loss. It was somewhat difficult to understand statements by chairmen of gas undertakings and engineers that the Act had made no difference to them. It must have made a difference, since it had certainly prevented sales which would have been made had the Act not been in operation. The continual passing of men into the forces rendered it extremely difficult to continue ordinary gas-making operations. In addition to this, repairs and maintenance were being much neglected; and he feared the results might be somewhat disastrous, if the war continued much longer. The coal market was in a very peculiar and unsatisfactory condition. What with the heavy advances in price over pre-war rates, and the uncertainty of future supplies—not to mention the anticipated attempt of the coalowners to have the limit price raised—the position of those responsible for maintaining a supply of gas was awkward in the extreme. It was greatly to be hoped that the Board of Trade would not yield to the requests of the coalowners, some of whom had not hesitated to evade the Act by devious methods. Speaking for himself, he had been fortunate in getting supplies—and at a price at which he was not disposed to cavil. His stocks were at the present moment heavier than they had ever been before. This he felt he owed in some degree to not getting at loggerheads with his coal suppliers—his experience being that "sweet reasonableness" and cautious dealing ensured him ample supplies, and usually of a quality better than could fairly be expected. Having thus no complaint to make of the quality of the coal he was receiving, his make of gas per ton was more than usual. It was, in fact, better than ever before. This was a condition of affairs upon which he could dwell with pleasure. One matter on which he touched when previously addressing the members was still giving him concern. He referred to meters falling to register, and also decaying more rapidly. The opinion he then expressed, that these results were partly caused by ammonia and oxygen being present in the gas, had, he found, been borne out by experiments conducted for the Institution of Gas Engineers. In his own case, since part of his washing plant had been diverted to other purposes, the gas was not so thoroughly freed from ammonia as was formerly the case. In this connection, he ventured to suggest that it would be a great advantage if some method, at once easy and cheap, could be devised of arresting the free oxygen after passing the purifiers. Its presence in the finished gas was very disadvantageous. Turning to another subject, he remarked that their minds must be concentrated upon improvements in the heating and cooking appliances, thus making gas still more popular. Cookers the ovens of which were externally heated would, he was of opinion, come into more general use.

CARBONIZATION OF PITCH.

Mr. E. W. SMITH, M.Sc., the Chief Chemist to the Birmingham Corporation Gas Department, read the first paper, which was on the subject of the "Carbonization of Pitch Materials." It will be found, with a report of the discussion, on p. 687. Before proceeding to the paper, Mr. Smith said he thought some explanation ought to be given to the members as to why the experimental staff of the Birmingham Gas Department were so prominent that afternoon. The Secretary had asked for papers; and they had resolved to do their best to help him out of his difficulty. It was in view of this that he had thought it might perhaps be useful to present to them the results of the experiments which had been carried out for the Ministry of Munitions between last November and about the end of May.

A hearty vote of thanks was accorded Mr. Smith, on the proposition of the PRESIDENT, seconded by the HON. SECRETARY, who said he had been careful not to miss the opportunity of securing this paper, which would add very greatly to the value of their "Transactions."

DETERMINING CALORIFIC VALUE OF ENRICHING SPIRITS.

Mr. T. F. E. RHEAD, M.Sc., of the Experimental Staff of the Birmingham Corporation Gas Department, then described, by the

aid of the lantern and blackboard, a method for the determination of the calorific value of enriching spirits. He said that up to the present not a great deal of work had been carried out with it; but later on he hoped to prepare some useful figures.

The PRESIDENT, in proposing a vote of thanks to Mr. Rhead, expressed the hope that, when these figures were available, he would give the Association the benefit of them.

The HON. SECRETARY seconded the vote, which was heartily passed.

HEAT TREATMENT OF STEEL IN COAL GAS.

Mr. C. M. WALTER, B.Sc., the Superintendent of the Industrial Heating Laboratories of the Birmingham Gas Department, read the final paper, which described "Recent Developments in the Heat Treatment of Steel in Coal Gas." This is reproduced on p. 691. In support of the statements made in the paper, Mr. Walter was able to show some first-rate samples of work done.

The author was thanked, on the motion of the PRESIDENT, seconded by Mr. G. C. PEARSON (Birmingham).

Mr. WALTER said he was sorry the paper was so short. A little later on he would have a lot of information which would probably be of more practical value; but he thought perhaps what he was now able to put before them might prove of interest as relating to a new thing.

NEXT SESSION'S WORK.

At a meeting of the Council of the Association, it was decided that next session more meetings should be arranged for than had been found practicable during the present session. Two or three papers have already been promised.

INSTITUTION OF WATER ENGINEERS.

The Summer General Meeting of the Institution was held last Friday, at the apartments of the Geological Society, Burlington House, W. The PRESIDENT (Mr. F. W. M'Cullough, J.P., M.Inst.C.E., of Belfast) was in the chair.

The proceedings commenced by the SECRETARY (Mr. Percy Griffith) reading the minutes of the meeting held on Dec. 10; and they were confirmed.

Afterwards, Mr. Alfred Sidwell (Higham and Hundred of Hoo Water Company) was elected an associate member; and Mr. Charles Horobin (Lincoln) was transferred from the class of associate member to that of member.

REPORT ON THE WORK OF THE PAST YEAR.

The PRESIDENT then made a report upon the work of the past year. In the first place, he thanked the Council for having unanimously agreed to nominate him a second time for election as President, and also expressed his appreciation of the repeated confidence shown by the members in having elected him to occupy the important and onerous position for another year. Proceeding, he said it was a matter of very great regret to himself, and he was sure to all the members, that, owing to the unsettled conditions caused by the continuance of the dreadful European War, it had not been possible for the members, with any reasonable hope of success, to resume their normal programme and procedure. It had been, however, the unanimous opinion of the Council that the members should content themselves, like most other institutions, with carrying on only the necessary and formal business of the Institution until the strain and stress of war had past. It had naturally been somewhat disappointing to him, as well as to the Lord Mayor of Belfast, and to his Chairman and the members of the Belfast Water Trust, that it had not been thought desirable, under present conditions, to hold the summer meeting in that city. The Council, however, had been assured that the welcome awaiting the Institution in Belfast would not lose any of its warmth because of the unavoidable delay. As it was the general desire of the Council that he should occupy the Presidential Chair during the period of the war, and thus have the opportunity of welcoming the members as President when the Declaration of Peace enabled them to pay the promised visit to Belfast, he had accepted their invitation subject to its being confirmed by the members. He had, therefore, again deferred the preparation of a Presidential Address. Unfortunately, the continuance of the war had made it impossible to maintain the usual activities, and had had a prejudicial effect both on the attendances at the meetings and on the membership roll. It would, therefore, be all the more gratifying to the members to observe that the financial position of the Institution had not, so far, been seriously affected. The statement of accounts for 1915 showed that the income was but slightly less than that for the previous year, and, the arrears written-off being considerably less, the net revenue was, in fact, slightly larger than that of 1914. As the expenditure on the summer meeting and "Transactions" was much below that of former years, and several items which came into the 1914 accounts did not recur last year, the balance carried to the accumulated fund was increased from £88 18s. 2d. to £175 6s. 7d. The members would also observe that last year the Council transferred the holding of Consols to 4½ per cent. War Loan. The investments held by the Institution represented a sum of £733, as compared with £585 at Dec. 31, 1914. The Council proposed to follow the example of many other kindred institutions in regard to not collecting subscriptions from members on active service; also from those who might be seriously prejudiced as a result of the war. If necesary, they would consult the members generally in regard to this matter. It had, however, been urged that, with an accumulated fund amounting to £716 19s. 8d., there could be no objection to extending some relief to those who had given their services to the nation at such a critical juncture as the present. In this connection, it would be gratifying to the members to observe that, of a total membership of 425, at least 36 were known to be on active service on Jan. 1, 1916; and this number had since been increased. The membership roll during the past three years had varied slightly:

	1913.	1914.	1915.
Honorary members	3	3	6
Members	244	242	230
Associate members	140	152	158
Associates	35	31	31
Totals	422	428	425

The losses by death during the year had happily been less in number than during the previous year; but the war had, no doubt, been the cause of the reduction in the number of new members applying for election. In common with other similar bodies, they must expect some check to any expansion under present conditions. The papers presented during the year were, of course, few in number; but he might reasonably claim that they were extremely useful and interesting, and each produced a valuable discussion. The Council had awarded an Institution Premium (value £5) to Mr. Henry Dewey, F.G.S., for his paper on "The Effect of Springs on the Water-Levels in the Chalk in East Surrey." The discussion on the difficult and complex subject involved in the definition of the term "Domestic Purposes" in General and Private Water Acts, which occupied the members at the Winter Meeting, had greatly assisted the Council in their endeavour to find a solution of the present difficulties. The matter was still under consideration; and it was hoped that definite proposals might be laid before the members at an early date. A Committee of the Council (assisted by Mr. William Matthews, who had rendered valuable services in connection with the matter) was now preparing standard clauses applicable to water-works contracts generally; and these would, in due course, be considered by the Council with a view to their publication for the use of the members. In conclusion, he expressed regret that the prolongation of the war had interfered to some extent with the work of the Institution, and had also prejudiced the professional interests of some of the members. Nevertheless, considering the vast interests at stake, and the unparalleled efforts that were being put forth by the manhood of the country in the cause of freedom and civilization, and viewing the situation from the wider standpoint of citizens of the British Empire and loyal subjects of the King, they might, he thought, without any approach to boasting, congratulate themselves on the present situation of the Allies, and confidently look forward to the resumption of normal activities in the near future, with such increased energy and efficiency as would, in some measure, compensate for the loss and wastage involved by the awful war.

INSTITUTION PREMIUM TO MR. DEWEY.

The PRESIDENT then called upon Mr. Dewey to receive the Institution Premium for the paper he read last year (as referred to in the President's statement). Mr. Dewey had chosen that the money should be spent upon books that he had selected; and, on receiving them, he was heartily applauded.

COAL SUPPLIES TO WATER-WORKS.

The PRESIDENT said, at the Council meeting that day, the question was considered of the difficulties of obtaining coal supplies for the maintenance of water-works generally. The Council passed a resolution to which they wanted the approval of the members. The resolution requested the Council to make urgent representations to the proper Government authorities that coal deliveries for water supplies should be guaranteed by the Government, and given the priority necessary to ensure the maintenance of the supply of water—such supplies being necessary to the national health and welfare, and to the production of war material. The President mentioned that some of the members complained of having been left with small reserves of coal, and had had great difficulty in getting renewals of contracts. Unless something resulted from the strong representations made, some of the water supplies in the country would be placed in an awkward position.

Moved by Mr. BINNIE (London), and seconded by Mr. F. H. BRUNT (Rochdale), the resolution was unanimously approved.

PAPERS AND DISCUSSIONS.

Two papers were read and discussed. The first was by Mr. D. HALTON THOMSON, M.A., on "The Alignment Diagram applied to the Flow of Water in Uniform and Compound Mains." The second was by Mr. W. P. WALKER, on "Plans and Records of Water Distribution Systems."

Moved by Mr. F. J. DIXON (Ashton-under-Lyne), and seconded by Mr. E. SANDEMAN (Derwent Valley Water Board), a hearty vote of thanks was passed to the readers of the papers.

Proposed by Mr. H. ASHTON HILL (South Staffordshire Water-Works Company), and seconded by Mr. T. MOLYNEUX (Stockport), a hearty vote of thanks was passed to the President and Council of the Geological Society for the use of their apartments.

THE CARBONIZATION OF PITCH.

By E. W. Smith, M.Sc., Chief Chemist to the Birmingham Corporation Gas Department.

[A Paper read before the Midland Junior Gas Association, June 24.]

The stocks of coal-gas pitch in the country are so great that during the last few months tar distillers have been endeavouring to find fresh outlets for this material.

Early in September last, experiments were commenced on the horizontal plant at the coal-test works, with a view to efficiently and economically carbonizing various pitch materials mixed with the coal. Different percentages were tried in a few preliminary experiments; and it was soon found that any of the materials specified in Tables I. and II. could be carbonized without inconvenience up to about 6 per cent., but that above these quantities trouble arose owing to stopped pipes. It was also found that the scale on the retorts was thicker and denser after the use of pitch. This, however, was not a serious matter.

In November last, the series of tests here published was commenced at the request of the High Explosives Department of the Ministry of Munitions. The conditions of testing were then discussed with Mr. W. Doig Gibb. Throughout all the tests no mechanical troubles whatever occurred during the process of carbonization. The tar in the hydraulic main appeared to be more fluid when pitch was used than when coal alone was being carbonized. The same coal was used throughout each of the series of tests. These were two well-known coals, the results from which had been found to be very regular. Tests on each coal alone preceded each series.

Weighed quantities of the pitch used were spread evenly over each truck of coal. The coal and pitch were put through the crushers, raised by means of a bucket elevator to an overhead hopper, and passed down a shoot to bogies, which conveyed the crushed mixture to the further overhead hopper commanding the De Brouwer charger on the horizontal plant. This procedure ensured an intimate mixture of the pitch and coal.

The sampling extended over the whole period of each complete test, which lasted six days, for each of the determinations given in the two tables. About 34 tons of coal per day were carbonized; and there was a preliminary run of at least twelve hours before the test commenced. Over 200 tons of coal were consequently carbonized for each individual test.

The retorts were not filled. There were 24 retorts charged every eight hours—the charge averaging 9·5 cwt. The retorts were ⏢ shape, 20 feet long and 23 in. by 16 in. cross section. A liquor seal was used in the hydraulic main, and the gas passed through the retort-house governor, air and water condensers, Livesey and Holmes brush-washers, and oxide purifiers.

The analyses of the different pitches and coals are to be found in the tables. Pitches marked 1 and 2 are the residual products from the distillation of heavy petroleum oil. They had the appearance and fracture of coal-gas pitch.

The Mond pitch was obtained from the pitching plant at our Saltley works. Here the tar made on the Mond producers is dehydrated and distilled; the light oils and the creosote being taken from the tar, and the pitch remaining. This creosote contains about 50 per cent. tar acids, as is to be expected from the method of gasification of the fuel.

The essential differences between the four pitches is that the coal-gas pitch is a product of high-temperature carbonization, and likely to be largely aromatic and naphthenic in its constituents; while the other three are largely paraffinic, and susceptible of further cracking at the normal temperatures of carbonization. This is borne out by the results.

The experiments were primarily carried out for the High Explosives Committee, with a view to determining the effect on the production of benzol and toluol through the admixture of different pitch materials with the coal. The chief utility in the carbonization of these materials (except coal-gas pitch) is in their value as

Table No. I.

Medium Quality Coal.	Coal Alone.	Coal Gas Pitch. 4·23 per Cent.	Mond Gas Pitch. 4·25 per Cent.	Pitch No. 1. 3·84 per Cent	Pitch No. 2. 4·03 per Cent.	Item.	
Tons per ton of coal	..	0·0440	0·0444	0·0399	0·0420	1	
Percentage	100 p.c.	4·23 p.c.	4·25 p.c.	3·84 p.c.	4·03 p.c.	2	
Make per ton of coal, cubic feet	12,030	12,578	12,636	12,743	13,086	3	
						4	
Specific gravity	0·508	0·501	0·458	0·493	0·482	5	
						6	
Temperature of combustion chambers	2250° F.	2250° F.	2320° F.	2320° F.	2300° F.	7	
Temperature of retorts	1895° F.	1860° F.	1900° F.	1940° F.	1930° F.	8	
Condensers	86° F.	90° F.	92° F.	84° F.	84° F.	9	
Meter	62·3° F.	56·0° F.	52·9° F.	59·5° F.	58·6° F.	10	
						11	
Illuminating power, No. 2	17·01	15·79	17·14	17·48	17·51	12	
Illuminating power multiple	205	199	217	223	229	13	
Illuminating power multiple per ton of material	..	..	270	451	571	14	
						15	
Calorific value, B.Th.U., net	512	500	523	515	524	16	
Calorific value multiple	616	629	661	656	686	17	
Calorific value multiple of material	..	295	1014	1003	1667	18	
Make per ton of pitch material calculated to 500 B.Th.U. standard	12,320	5,900	20,280	20,060	33,340	19	
Tar, gallons per ton	11·0	13·4	13·9	13·0	13·9	20	
Specific gravity	1·199	1·218	1·217	1·215	1·200	21	
Gallons per ton of material	11·0	54·5	65·3	50·1	69·0	22	
Toluol } tar {	0·413 p.c.	0·290 p.c.	0·260 p.c.	0·263 p.c.	0·304 p.c.	23	
Benzol } tar {	0·745 p.c.	0·480 p.c.	0·495 p.c.	0·459 p.c.	0·546 p.c.	24	
						25	
	Gallons per 12,000 cub. ft.						
Toluol } gas {	0·375	0·422	0·351	0·504	0·509	26	
Benzol } gas {	1·577	1·605	1·878	1·846	1·640	27	
Total toluene per ton of pitch, gallons	0·4214	1·35	..	3·70	4·19	28	
Total benzene per ton of pitch, gallons	1·6630	1·89	8·64	8·94	4·78	29	
						30	
Liquor gallons	35·1	37·0	33·8	36·0	33·7	31	
Percentage	100 p.c.	4·23 p.c.	4·25 p.c.	3·84 p.c.	4·03 p.c.	32	
Coal analysis—							
H_2O	7·0 p.c.	1·5 p.c.	1·2 p.c.	1·9 p.c.	0·03 p.c.	33	
Volatile matter	34·9 p.c.	54·9 p.c.	82·5 p.c.	73·6 p.c.	85·8 p.c.	34	
Ash	4·3 p.c.	0·2 p.c.	0·3 p.c.	0·17 p.c.	Trace	35	On dry basis
Coke	65·1 p.c.	45·1 p.c.	17 5 p.c.	26·4 p.c.	14·2 p.c.	36	
Sulphur	1·60 p.c.	1·21 p.c.	1·42 p.c.	3·85 p.c.	3·93 p.c.	37	
Melting point	..	92° C.	78° C.	110° C.	84° C.	38	
Twisting point	..	60° C.	55° C.	58° C.	24° C.	39	
Free carbon	..	34·7 p.c.	8·6 p.c.	16·1 p.c.	0·15 p.c.	40	
						41	
						42	
Coke analysis—							
Volatile matter	2·1 p.c.	2·2 p.c.	1·2 p.c.	1·7 p.c.	2·2 p.c.	43	
Ash	8·7 p.c.	8·8 p.c.	7·6 p.c.	9·5 p.c.	8·3 p.c.	44	On dry basis
Sulphur	1·52 p.c.	1·90 p.c.	1·55 p.c.	1·78 p.c.	1·63 p.c.	45	
Coke made per ton of material used	0·651	0·451	0·175	0·264	0·142 p.c.	46	
						47	
						48	
Gas analysis—							
CO_2	2·2 p.c.	2·5 p.c.	2·2 p.c.	2·4 p.c.	2·3 p.c.	49	
C_nH_{2n}	2·8 p.c.	2·9 p.c.	2·9 p.c.	2·4 p.c.	3·5 p.c.	50	
O_2	0·7 p.c.	0·7 p.c.	0·6 p.c.	1·1 p.c.	1·5 p.c.	51	
CO	9·3 p.c.	8·7 p.c.	10·0 p.c.	8·5 p.c.	8·7 p.c.	52	
H_2	46·9 p.c.	45·5 p.c.	43·1 p.c.	46·0 p.c.	41·9 p.c.	53	
CH_4	28·4 p.c.	27·7 p.c.	31·2 p.c.	28·0 p.c.	29·4 p.c.	54	
N_2	9·7 p.c.	12·0 p.c.	10·0 p.c.	11·6 p.c.	12·7 p.c.	55	
						56	
Sulphur in gas, grains per 100 cubic feet	30·7	29·7	31·3	38·3	37·9	57	
Naphthalene, grains per 100 cubic feet	4·30	2·80	3·80	2·75	2·98	58	

TABLE No. II.

Rich South Yorkshire Coal.	Coal Alone.	Pitch No. 1. + 5·05 per Cent.	Mond Gas Pitch. + 5·54 per Cent.	Coal Gas Pitch. + 3·21 per Cent.	Pitch No. 2. + 2·57 per Cent.	Item.
Tons per ton of coal	..	0·0532	0·0587	0·0332	0·0264	1
Percentage	100 p.c.	5·05 p.c.	5·54 p.c.	3·21 p.c.	2·57 p.c.	2
Make per ton of coal, cubic feet	12,613	13,182	12,052	11,898	12,791	3
						4
Specific gravity	0·483	0·487	..	0·518	0·462	5
						6
Temperature of combustion chambers	2250° F.	2220° F.	2290° F.	2240° F.	2300° F.	7
Temperature of retorts	1840° F.	1820° F.	1850° F.	1840° F.	1870° F.	8
Condensers	90° F.	92° F.	87° F.	84° F.	87° F.	9
Meters	61·1° F.	61·1° F.	62·3° F.	63·6° F.	63·9° F.	10
						11
Illuminating power, No. 2	17·96	18·58	19·40	18·90	19·03	12
Illuminating power multiple	227	245	234	225	243	13
Illuminating power multiple per ton of materials	..	338	85	..	622·5	14
						15
Calorific value, B.Th.U., net	521	535	560	546	545	16
Calorific value multiple	657	705	675	650	697	17
Calorific value multiple of material	..	902	307	..	1587	18
Make per ton of pitch material calculated to 500 B.Th.U. standard	13,140	18,004	6100	..	31,740	19
Tar, gallons per ton	12·9	14·6	15·0	13·65	13·8	20
Tar specific gravity	1·211	1·218	1·210	1·198	1·214	21
Gallons per ton of material	12·9	32·0	35·7	22·6	34·8	22
Toluol in tar	0·283 p.c.	0·329 p.c.	0·348 p.c.	0·403 p.c.	0·383 p.c.	23
Benzol in tar	0·508 p.c.	0·582 p.c.	0·547 p.c.	0·633 p.c.	0·678 p.c.	24
						25
	Gallons per 12,000 cub ft.					
Toluol gas	0·532	0·476	0·650	0·463	0·593	26
Benzol gas	1·305	1·153	1·432	1·004	1·947	27
Total toluene per ton of pitch, gallons	0·5955	..	1·87	..	3·38	28
Total benzene per ton of pitch, gallons	1·4375	..	1·41	..	2·77	29
Liquor, gallons per ton	30·1	27·8	33·6	29·6	31·0	30
Percentage	100 p.c.	5·05 p.c.	5·54 p.c.	3·21 p.c.	2·57 p.c.	31
Coal analysis—						32
H_2O	3·0 p.c.	0·8 p.c.	0·8 p.c.	0·91 p.c.	0·03 p.c.	33
Volatile matter	36·4 p.c.	63·9 p.c.	81·8 p.c.	54·7 p.c.	77·8 p.c.	34
Ash	7·1 p.c.	0·4 p.c.	0·6 p.c.	0·9 p.c.	Trace	35
Sulphur	2·3 p.c.	4·8 p.c.	0·9 p.c.	1·72 p.c.	3·6 p.c.	36
Melting point	..	120° C.	88° C.	93° C.	87° C.	37
Twisting point	..	72° C.	64° C.	58° C.	19° C.	38
Free carbon	..	3·8 p.c.	18·0 p.c.	37·0 p.c.	0·6 p.c.	39
						40
Coke analysis—						41
H_2O	8 8 p.c.	3 5 p.c.	4·0 p.c.	8·94 p.c.	4·1 p.c.	42
Volatile matter	1·7 p.c.	3·4 p.c.	2·0 p.c.	3·22 p.c.	1·9 p.c.	43
Ash	10·6 p.c.	10·8 p.c.	9 2 p.c.	12·60 p.c.	9·1 p.c.	44
Sulphur	1·1 p.c.	2·0 p.c.	2·4 p.c.	2·71 p.c.	2·91 p.c.	45
Coke made per ton of material used	..	0·561	0·200	0·733	0·222	46
						47
Gas analysis—						48
CO_2	2·0 p.c.	2·1 p.c.	1·5 p.c.	2·3 p.c.	2·5 p.c.	49
C_nH_{2n}	3·0 p.c.	3·6 p.c.	3·3 p.c.	4·0 p.c.	3·0 p.c.	50
O_2	1·0 p.c.	1·0 p.c.	0·7 p.c.	1·2 p.c.	0·4 p.c.	51
CO	6·9 p.c.	6 5 p.c.	7·1 p.c.	6·6 p.c.	7·4 p.c.	52
H_2	45·2 p.c.	40·3 p.c.	45·3 p.c.	42·5 p.c.	42·5 p.c.	53
CH_4	32·2 p.c.	34·1 p.c.	32·8 p.c.	32·3 p.c.	34·2 p.c.	54
N_2	9·7 p.c.	12·4 p.c.	9·3 p.c.	11·1 p.c.	10·0 p.c.	55
						56
Sulphur in gas, grains per 100 cubic feet	94·1	104·2	80·6	77·3	106·7	57
Naphthalene, grains per 100 cubic feet	5·80	3·70	4·40	3·90	3·20	58

On dry basis

All on dry basis

enriching agents to take the place of benzol, cannel, or carburetted water gas. The tests for toluol and benzol in gas and tar were carried out according to the specifications of Dr. Colman. Items 28 and 29 show quantities of these products produced from the use of these materials. The tests for illuminating power may be taken as of but passing theoretical interest.

Coal-gas pitch is the material that is of the greatest immediate interest to most of us. The experiments conclusively indicate that there is no difficulty in carbonizing it. I should not advise that it be tried on any but horizontal retorts, and with hand-charging or a De Brouwer charger, when quantities up to 5 per cent. are used. Crushed hard material up to 1 per cent. may be used in horizontals with most other forms of charger. It is not a very suitable material for verticals, as the heat from the retorts will tend to soften the pitch while in the overhead hoppers, and prevent the travel of the coal therein. Inclines are again not suitable, as the coal will not flow down the retorts easily enough for smooth working.

The figures of makes per ton in both these tables are all worked out on the weight of coal alone. The increases or decreases, when carbonizing mixtures, may then be credited to the actual weight of pitch used in each case (Item 1.).

The results obtained with pitch may be evaluated by comparing them with those obtained from a known coal somewhat as follows:

Pitch.

		s. d.
Gas at 2s. per 1000 cubic feet	− 6420 cubic feet	− 12 10
Tar at 2d. per gallon	+ 43·5 gallons	+ 7 3
Liquor at 1·2d. per gallon	—	—
Coke (less 12 per cent. fuel), at £1 per ton	− 0·2 ton	− 4 0
		− 9 7

With a medium quality coal used under the conditions stated in the test, coal-gas pitch is worth 9s. 7d. less than the price of the coal, but with a richer coal it is worth still less. The cooler temperatures of the evolved gases and their increased volume would tend to increase the quantity of liquor obtained from the coal.

It does not pay to substitute coal-gas pitch in the ordinary way for a small percentage of coal; but it is a convenient means of disposing of inflated stocks, and then preferably mixed in very small quantities with poorer coals. An increase in the normal temperature of carbonization is also an advantage. With richer coals it would seem as if the extra tar which it condensed might, to a small extent, scrub the gas and impoverish it to a greater degree than the gas is enriched by the cracked oils from the pitch.

There are so many ways of evaluating a coal that I have refrained from drawing up a table for these materials. The statement of results is before you, and those who wish to do so may make an evaluation for themselves. These materials—excepting coal-gas pitch—are better considered as enriching agents; and they show a better value when compared with other enriching agents, rather than with coal.

The evaluation for calorific value is conveniently based on the cost in pence of raising 1000 cubic feet of gas 10 B.Th.U. (from, say, 490 to 500 B.Th.U. net). The cost of these materials will vary very considerably, depending on a number of factors. Let coal-gas pitch and Mond-gas pitch cost 16s. per ton, and pitch No. 1 and No. 2, 8os. per ton. Let enriching spirit have a calorific value of 150,000 B.Th.U. per gallon, and cost 1s. 8d. per gallon. Carburetted-water gas of 550 B.Th.U. net requires 3·25 gallons of oil per 1000 cubic feet. Let the cost of production of water gas be 5d. not including oil, and the cost of oil 8d. per gallon. Let cannel with a calorific value multiple of 1013 cost 40s. per ton. The cost of enrichment per 1000 cubic feet 10 B.Th.U. per cubic foot will then be:

	With Rich Coal. Pence.	With Poor Coal. Pence.
Coal-gas pitch	No enrichment ..	0·65
Mond pitch	0·63 ..	0·19
Pitch No. 1	1·07 ..	0·96
Pitch No. 2	0·60 ..	0·57

	Pence.
Carburetted water gas	5·0
Carburene enriching spirit	1·33
Cannel	0·50

It is a confusing matter to try to fix on the market values of these materials; but those who have to pay more or less than the figures I have given for calculation purposes will be able to correct the enriching value figures accordingly.

During the tests, some trouble occurred with pitch No. 2, as it was too soft to put through the crushers. The coke produced showed no signs of having been affected by the use of pitch, though there were indications that less breeze and dust were made. Mond-gas pitch has been carbonized on two of the Birmingham works in horizontal retorts for some months now, to the extent of about 60 tons per week; and the results have conformed with those obtained on the coal test works, as far as can be determined.

The 36 ton per day plant on the test works has run continuously from September to May, carbonizing pitch materials; and no troubles have been experienced. These materials show equally satisfactory results in intermittent verticals as in horizontals; but the quantity used must not exceed 20 per cent., as the pitch may drip from the retort-lids and cause inconvenience to the men. In continuous verticals the results were poor, as the only effect was to distil off the volatile matter without changing its composition. The cracking space was apparently too small for the increased oils evolved.

DISCUSSION.

Mr. SMITH, at the conclusion of his paper, said that, if the members would look at the tables, a great deal more could be gathered from an analysis of the results than by generalization. If, for instance, they would glance at items Nos. 33 to 40, they would see the composition of the various materials. In Table I., taking coal alone, the volatile matter was 34·9 per cent., and the coke, by difference, 65·1 per cent. In the case of the coal-gas pitch, the analysis was, volatile matter 54·9 per cent., and free carbon 34·7 per cent., with coke 45·1 per cent. With Mond gas pitch, the volatile matter was 82·5 per cent. All this, being volatile, was capable of being affected by heat, and most of it was capable of being cracked. The free carbon was extremely low; and, of course, less coke was produced. Pitch No. 1 was a residual product from the distillation of heavy petroleum. Normally, the petroleum was distilled until coke was produced, and then the stills were emptied of this hard coke; but the distillers had stopped off before reaching this coke stage. The volatile matter was 73·6 per cent., and the free carbon 16·1 per cent. Pitch No. 2 had 85·8 per cent. of volatile matter, and only 0·15 per cent. of free carbon. The temperatures of carbonization, as it happened, were higher during the tests for Table I., with medium quality coal, than in the case of Table II. It would, of course, have been better if it had been the other way about, as the richer coal would require a higher cracking temperature than the poorer coal. The illuminating power multiple—that was the value of the material from the illuminating power multiple point of view—had not been worked out in the paper, in the belief that this really was of no particular importance at the present time. In the analysis of the coke produced from the mixtures in Table I., the volatile matter varied slightly, between 2·2 and 1·2 per cent. It was almost impossible to control the working much closer than this. If any further information was desired with regard to the tests, he would be only too glad to give it.

Mr. G. C. PEARSON (Windsor Street) remarked that the paper showed how useful it was to have a plant like their coal test works in which to carry out such investigations. What he was particularly interested in was the absolute proof which the paper furnished of the superiority of the Mond gas pitch and petroleum pitches over the coal-gas pitch. He had never seen coal-gas pitch carbonized on an extensive scale; but he always had the opinion that what was cracked in the retorts mostly came down again in the hydraulic mains. To some extent this seemed to be borne out by the paper. They had for some weeks now been using Mond gas pitch with advantage at Windsor Street. He believed they had worked without mechanical difficulties of any kind. There had been a little trouble with stopped pipes; but apparently this had nothing at all to do with the use of the pitch, because he went on the top of the hydraulic mains and had one or two caps taken off, and the pipes were as clean as if they had been polished. Any trouble that occurred was right down in the mouthpiece. For a short time they had given up the use of pitch, to see whether it would improve matters; but there had been no difference whatever. Of course, the tables that Mr. Smith had submitted to them were rather big to take in at the first glance. It was a pity he was unable to work at higher temperatures with the Yorkshire coal, because this would have made a great difference to Table II. When working out the figure of cost in using pitch, there was one point which it was important to consider, and that was the expense of dealing with the pitch. One could not put the handling of pitch in the same category as that of coal; it had to be handled separately. It had to be dropped and picked up again, and run into the crusher; and care had to be taken to mix it evenly with the coal. This would involve 8d. or 9d. per ton extra cost.

Mr. SMITH said it was done by putting the pitch on the top of each truck of coal.

Mr. PEARSON remarked that he was referring to actual working; and he thought the extra cost would be quite 8d. or 9d. per ton. The pitch had to be unloaded separately from the trucks, and then picked up in barrows, and taken to the crusher. The crusher at Windsor Street dealt with 100 tons an hour. The pitch was dropped through a viaduct on to the floor of the retort-house, and picked up from the floor by barrows, which tipped it into a special shoot feeding into the crusher. This shoot was so designed that it fed the pitch in at a constant rate, which gave them from 2 to 3 per cent.—that was to say, 2 or 3 tons an hour. The extra cost of handling was quite 9d. per ton of pitch.

Mr. H. JONES (Stourbridge) remarked that at his works the matter had been under consideration, but they had not as yet done anything with it. He noticed the prices of pitches No. 1 and No. 2 seemed very high. He supposed it was because they had to be brought from America.

Mr. SMITH replied that they were two special pitches, which the Government wished tried, for a particular purpose.

The PRESIDENT (Mr. F. J. Ward, of Knowle) remarked that he also had had no experience of the carbonization of pitch. He had thought of making a few experiments, but found the cost of the pitch was such that it would have been a distinct loss to use it. Had the cost quoted been anything like reasonable—say, two-thirds the cost of coal—they would have tried it; but the distillers asked almost exactly the same price for pitch as he was buying coal at, and this put the matter out of court. However, he still hoped to carry out his experiments, when the cost came down to a more reasonable figure. In his case, of course, they could only have the pitch in such quantity that it would be somewhat of a nuisance to them; but this they would have to put up with, as they could not have less than a truck-load. Mr. Smith's figures were such that, unless they had had previous experience, they could not at once digest them. When, however, the paper was published, they could study it at their leisure; and the result no doubt would be to increase their feeling of gratitude to the author for the work he had done on behalf of the industry and of the country.

Mr. SMITH said there was one other point he would like to mention. He was not of the opinion that it would ever pay for the gas engineer to carbonize coal-gas pitch for the results he would actually get as compared with coal. As a gas-making proposition, one could not crack it any more than it had been cracked, unless it was carbonized at an enormously high temperature; and this was not practicable in an ordinary gas-works. But as a means of getting rid of big stocks, one could always secure increased coke and increased tar by carbonizing small quantities of pitch.

SURFACE COMBUSTION FOR DOMESTIC USES.

In the course of a paper which he read before the Iowa District Gas Association, Mr. J. D. THOMAS (Messrs. Rathbone, Sard, and Co.), of Albany, N.Y., explained the system of surface combustion, and its application to hotel and domestic uses.

The theory of surface combustion, he said, is based upon the principle of supplying gas with just sufficient air, and no more than is necessary to allow the complete combustion of the gas, and putting the heat generated by the process into such a form that it may be most readily absorbed by the object to be heated. In order to obtain complete combustion, it is necessary, not only to have the proper ratio of air to gas, but also to have the mixture homogeneous. In order to obtain thorough mixture, the air and gas are introduced into the manifold by means of a specially constructed proportional valve, in such a manner that the mixture is homogeneous by the time it reaches the burner.

In order to burn such a perfect mixture, and not have it flash-back into the mixture-chamber, it is necessary for the mixture to pass out of the orifices of the burner with a greater velocity than the rate of combustion of the mixture. Under this condition, the mixture will not support combustion unless its velocity is immediately decreased, after leaving the orifices, to that of the rate of combustion. This may be done either by a bed of loose refractory material or by metal or refractory strips. This refractory material or strip becomes radiant; and radiant heat can be more readily absorbed than any other kind of heat.

The "Rex Ray" surface combustion apparatus, manufactured by Messrs. Rathbone, Sard, and Co., consists of four essential parts—the blower, the regulator, the proportional mixing valve, and the burner. The blower is a constant pressure blower, and supplies air at about 2½ inches water pressure. This low pressure has been selected so as to be lower than the pressure of the gas in the mains. The regulator is so designed that it will cut the gas pressure down to that of the air. The valve is a proportional one, and can be adjusted to admit the proper amount of air necessary for the perfect combustion of the gas being used. The burner (which is the most important part of the apparatus) consists of a mixture-chamber, a combustion-chamber connected by small tubes to the mixture-chamber, and a baffle. It is necessary to design the burner for each different application, in order that the heat, which in this system is very concentrated, may be properly distributed.

The "Rex Ray" broiler has a burner of the bar type with a metal burner strip. The strip becomes radiant; and the broiling is done entirely by radiant heat. A comparative temperature test was run by one of the large gas companies in the East, between a surface combustion six-burner broiler, and a standard broiler with five-bar burners of the bunsen type. The bunsen bar-burner broiler proved to be only about 61 per cent. as efficient. A comparative test was run by another company between a surface combustion six-burner broiler and a syphon blast-broiler with eight burners. The test was an actual broiling test; and two 6 lb. sirloin steaks, about 2 inches thick, were used,

The syphon blast-broiler proved to be less than 50 per cent. as efficient. The syphon blast-broiler was using 160 cubic feet of gas an hour; while the surface combustion "Rex Ray" broiler used only 90 feet. With dollar gas and a daily run of ten hours, the saving would be the difference between $1.60 and 90 c., or 70 c. per day. This shows that the "Rex Ray" broiler can be run almost two days for the cost of fuel used by the other type in one day. This does not really indicate the true difference, as the surface combustion broiler had almost 60 square inches more broiling surface, and the broiling-grid was in the third stage from the top—the upper stages being too hot.

In comparing the operating cost of the surface combustion broiler with that of charcoal, we find a great difference. In one of the large hotels in a city of the Middle West, the surface combustion broiler was run for 43 days at an average cost of 37 c. per day. The charcoal broiler had cost an average of 90 c. per day for the same service.

The "Rex Ray" range outfit is rather unique, as it can be installed with very little change in hotel coal-ranges that are already in service, or may be put in new hotel coal-ranges. The burner is made up in units of two or three burners, according to the size of the range. For a 4-foot section, single oven range, two burners are used, with a rate of 100 cubic feet per hour of 600 B.Th.U. gas. These burners will maintain a temperature of approximately 500° Fahr. in the oven, and a cooking-top of 4 feet by about 25 inches. This top will have a hot spot of over 1000° Fahr., and the rest of the top will be hot enough to work on. In fact, the outfit duplicates all the conditions of a coal-range, which is the *chef's* ideal, and has all the good qualities of gas. The ordinary gas-range having the same sized oven, but a top approximately 34 by 38 inches deep, uses from 150 to 200 cubic feet of gas an hour when running both oven and top. A standard 4-foot hotel coal-range section equipped with "Rex Ray" burners uses only 100 cubic feet of gas to heat both the oven and top. This shows, for the continuous service that is necessary for hotels and restaurants, a saving of 25 to 50 per cent. The future application of the surface combustion process to hotel and domestic uses is practically unlimited. Burners are being applied to hotel bake-ovens of the portable type; and this apparatus will be on the market in the near future.

The third, and latest, application is to small portable room-heaters. This is different from other surface combustion apparatus, in that it will not require a blower to operate it. It will give radiant heat, just as other surface combustion apparatus does, and will undoubtedly be much more efficient than any other kind of room-heater on the market.

BOILER-HOUSE DESIGN AND OPERATION.

Coke-Breeze as Fuel.

The Engineer and Manager of the Glasgow Corporation Electricity Department, Mr. W. W. Lackie, contributed a paper at last week's convention of the Incorporated Municipal Electrical Association, in the course of which he dealt with questions of boiler-house design and equipment, fuel handling, and storing, with the results of some experiments on burning coke breeze or gas-coke riddlings—pointing out that such fuel costs only 20 per cent. of the price of coal, and has a calorific value of 60 per cent. of that of coal. The "Fuel" section will bear reproduction.

The selection and purchase of fuel is a question dependent upon the position of the site relative to the nearest coalfields and upon the nature of the load. Power stations near the coalfields can use low-grade fuel, whereas it is often more economical to use high-grade fuel in stations remote from the coalfields, as the same freight has to be paid for ash as for carbon.

The kind of fuel also depends upon the nature of the load, as it is a recognized fact that a higher overload duty can be obtained from a boiler fired with good quality coal with a given draught than can be got with low-grade fuel. If a station has a purely lighting load, and consequently a low load-factor, it is often more economical to use the best coal, because, with the higher overload thus made possible, the number of spare boilers can be kept down to a minimum.

It is now common practice to buy fuel on a calorific basis; but it must always be remembered that, along with calorific value and analysis, there are to be taken into account physical properties. For instance, two samples of coal may show an approximately similar calorific value figure, and present wide differences of behaviour in the furnace. Actual boiler tests must, therefore, be made with sample truckloads of coal if the best and most economical selection is to be made. The author does not advocate a slavish adoption of the calorific value basis in the purchase of coal, for the simple reason that coal is not a manufactured article but a natural product; and if we are to hold the colliery owner or his agent responsible for its calorific value, he will undoubtedly (and quite properly) cover himself by increasing the price accordingly; whereas if the coal contractor is not tied down, the customer is sharing the risk inseparable from a natural product. The contractor can be, and should be, generally tied down to supply from particular pits.

A practical test in a boiler specially equipped for the purpose is a very reliable guide to calorific value. The results of such tests should be reduced to a common basis. A good unit of comparison is the cost of evaporation of 1000 lbs. of water from and at 212° Fahr. or the number of pounds of water evaporated for 1d. of coal, including coal and ash handling, which varies with the quality of the coal. It is usual to express the coal economic result for the whole station in pounds of coal per kilowatt-hour generated at the switchboard; but as this must obviously vary with the calorific value of the coal and the steam consumption of the engine or turbine plant, the better unit to use for general comparison is the British thermal unit per watt-hour.

Even this is not perfect, as it does not allow for the variation in load-factor between different power stations; but it does enable comparisons to be made irrespective of variations in calorific value. In two of the Victoria Falls power stations, the economic result obtained in the way proposed gave in one station 27 B.Th.U. per watt-hour, and in another 26 B.Th.U. Both these stations had very high load-factors; whereas in many of the London stations, where the lighting load is predominant, the average result is in the neighbourhood of 40 B.Th.U. per watt-hour. Daily samples of coal, as delivered, should be sent to the laboratory of the undertaking for calorific analysis. An assistant, working with a bomb calorimeter, can test twelve samples a day working from 9 to 1 and from 2 to 5 o'clock. These tests are recorded in a coal test-book for reference. As the results of tests obtained by any or all of the methods above referred to are tabulated and arranged, an index of the pits in the coalfield from which the fuel supply is mainly or wholly drawn can be compiled, and coal prices as received can be equated on a calorific value basis.

An interesting experiment has been carried out in one of the Glasgow gas-works recently. Gas-coke breeze or gas-coke riddlings were burned successfully on chain-grate stokers with forced draught. A special form of arch had to be built. This breeze can be bought at 20 per cent. of the price of coal; and it has a calorific value of at least 60 per cent. of coal. There is a large amount of ash; but the experiment went to show that, with intelligent superintendence, good results could be obtained with this class of fuel, although the actual output of the boiler was considerably reduced.

With regard to the whole question of fuel, experience seems to show it is preferable to buy the best; for while good results may be obtained with inferior fuel, careful and constant attention to the fires is necessary with such fuel, whereas with first quality fuel very little attention is required.

In conclusion, the author referred to Professor Bone's recent lectures dealing with fuel economy and the utilization of coal, and to the Committee appointed by the British Association to look into, and report upon, the question of fuel economy.

Photometric Work at the Reichsanstalt in 1915.

The report of the Imperial Physical Technical Institute (Reichsanstalt) at Charlottenburg for the year 1915, states that whereas seventy-four Hefner lamps were examined for certification in the year 1914, only three were examined in the past year. This great diminution is due partly to the reduced home requirements, but also to a large extent to the almost complete stoppage of orders from abroad. The embargo placed by the Government on the use of brass has also interfered with the manufacture of Hefner lamps. In addition to electric lamps, durability tests were carried out on thirty-three incandescent spirit lamps, and one inverted gas-lamp. Other materials have been substituted for brass and copper in the construction of incandescent spirit lamps. The gasification of the spirit is started by an auxiliary flame, which subsequently is automatically extinguished—the gasification then continuing through the conduction of heat.

Supply of Coal in Holland.—The supply of coal in Holland having now been taken in hand by the Government, the continued existence of the Mutual Dutch Coal Reserves Company has been rendered unnecessary; and at a recent meeting it was unanimously decided that it should be wound up. The shareholders are to receive their money back; and the remaining funds will go to the Royal Relief Committee. Mr. J. van Rossum du Chattel, who presided over the meeting, expressed his satisfaction that the Company had served the purpose for which it was brought into being. Up to the present, the supply of coal from British ports has gone on regularly, in accordance with contracts; but the same thing cannot be said in regard to coal from Germany.

Cast-Iron Pipe Manufacture in America.—According to the "Ironmonger," in 1914 there were nine more cast-iron pipe makers in the United States than in 1909; but the total value of the product was less by 9·6 per cent. The United States census, in a preliminary statement, summarizes reports received from sixty-nine cast-iron pipe plants, the total product of which in the year 1914 was valued at $27,574,773. Of these, sixty-one made the manufacture of cast-iron pipe and fittings their principal business; while the remaining eight produced pipes as a subsidiary product. In 1909 there were fifty-two establishments, with an output valued at $29,153,723. The cast-iron pipe product of 1914 comprised 1,092,208 tons net, valued at $25,391,714, consisting of 880,556 tons of gas and water pipe and fittings (value $19,218,006) and 211,652 tons of soil and plumbers' pipe and fittings (value $6,173,708). In addition, 26,199 tons of castings other than pipe and fittings were produced (value $741,381), and products other than castings valued at $1,441,678.

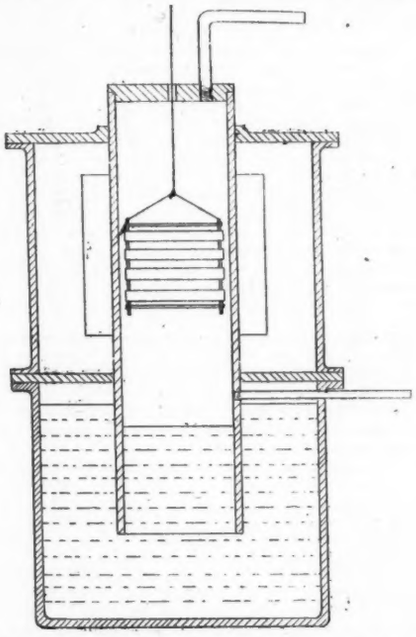
RECENT DEVELOPMENTS IN THE HEAT TREATMENT OF STEEL IN COAL GAS.

By C. M. WALTER, B.Sc., Superintendent of the Industrial Heating Laboratories of the Birmingham Gas Department.

[A Paper read before the Midland Junior Gas Association, June 24.]

The subject of this paper refers to developments in connection with the carbonizing or case-hardening of mild steel with coal gas as the carbonizing medium, as a result of experimental work which has been recently carried out with a view to determining whether such a process could be put to practical utility. Up to the present, in this country, little appears to have been done as regards the use of a hydrocarbon gas as the carbonizing medium in case-hardening processes; and where a gas has been used at all, it has invariably been either a mixture of carbon monoxide and carbon dioxide or carbon monoxide alone.

In the case of the majority of carbonizing processes, the carbonizing medium consists of a solid carbonaceous material, such as burnt leather or charred bone mixed with nitrogenous compounds; the method of procedure being as follows: The work to be cased is placed in iron boxes and tightly packed with the carbonizing material, after which the boxes are soaked in a furnace at a temperature of 850° to 900° C. for from three to eight hours, according to the nature of the work and the depth of case required. The work is then allowed to cool in the boxes, after which it is re-heated in an open oven furnace and quenched to produce the required surface hardness; the re-heating process being repeated in some cases two or three times to refine the case



and toughen the core of the work. Although such a process is capable of giving extremely good results, it is nevertheless difficult to ensure the whole of the work coming out perfectly uniform, as is required in many cases where expensive and intricate articles are being handled.

With the gas system ordinarily used, the work is heated up in a retort in contact with carbon monoxide or carbon dioxide under pressure; but owing to the expense of installing, and the cost of running, the gas producing plant required for the purpose, it is only in connection with work of a very special nature that such a system is commercially practicable on a large scale.

The experiments which are at present being carried out by the author are in connection with the use of a hydrocarbon gas, such as town's gas, for this purpose; and from the results which have been obtained it would appear there is every prospect of such a gas being employed in this connection on a full manufacturing scale. The experimental furnace used in connection with this work consisted of a circular iron retort with its lower end sealed in an oil-quenching tank and heated by a furnace forming a jacket round its upper portion, as shown.

The work to be carbonized was suspended by means of wires in the body of the retort, in such a manner that the carbonizing gas could have free access to the whole of the surface to be carbonized. Coal gas was passed into the retort at its lower end through a pipe situated about an inch above the level of the oil in the quenching tank; the waste gas from the retort being burnt at its mouth. Experiments were first carried out with town's gas at a pressure of about 2 inches water-gauge and with a retort temperature of 780° to 800° C.; and it was found that, working under these conditions, very little carbon was absorbed by the steel. The gas was then bubbled through a solution of ammonia and passed into the retort under similar conditions, with the result that a large carbon absorption occurred, showing that the presence of a nitrogen compound was necessary to enable the dissociation of certain of the hydrocarbons to take place, and also to cause the carbon thus set free to combine with the steel. Further experiments seem to show that the action of the ammonia was chiefly of a catalytic nature, as the greater portion of the ammonia used appeared in the spent gases at the outlet of the retort.

Further experiments were carried out in a retort having a diameter of 2 inches and a length of 4 inches; the volume of the coal gas used being approximately 15 cubic feet per hour, and containing approximately 10 per cent. by volume of ammonia gas. When working with a retort temperature of about 900° C., the depths of case produced on work consisting of ½ inch square mild steel bar, amounted to 5-64ths in four hours carbonizing, which is found to be much greater than that produced under similar conditions with a solid carbonizing medium. Further, the case was of a much closer grain than usually obtained, with the result that the surface hardness produced on quenching was greater than that usually obtained.

In order to prevent decarbonization of the surface of the carbonized material by contact with air during the re-heating process, the work was sealed in coal gas and plunged directly into the quenching bath sealing the mouth of the retort so soon as the correct hardening temperature had been reached. Thus during the whole process the work was free from oxidation, and was cased absolutely uniformly over the whole surface.

Although at the present time no figures are available regarding the costs of case-hardening by the above method on a large scale, further experimental investigation is being conducted on practical lines with a modified design of furnace, in which the spent gases from the retort are utilized in heating-up a regenerative setting; and from the results so far obtained there seems little doubt but that the application of town's gas in this connection can be regarded as a commercial proposition.

DISCUSSION.

Mr. G. C. PEARSON (Windsor Street) said it seemed to him that the method described by the author was a good way of using town gas. He would like to know whether there was a distinct advantage in time with this method as compared with the ordinary system, and also whether the case-hardening was as good.

Mr. WALTER said the first great advantage of the method he had described was on the score of cost; and the second was that they had perfect control over the addition of the carbon. By the latter, he meant that they could go on adding carbon to the steel indefinitely, to produce any depth of case required, or any carbon-content case needed. This it was only possible to do to a limited extent with the solid system, because the carbon available in that case was only what was immediately in contact with the material itself. With the ordinary method, there was the cost of handling the material and packing the boxes; and the expense of the boxes themselves was a considerable item. He believed one-third of the cost of carburizing was incurred in handling, packing, and providing boxes. This was all done away with. Moreover, they got the gas absolutely perfectly distributed over the whole of the surface of the steel, which was quite impossible with the solid system. However carefully the work was packed, when using the solid system, owing to the moisture always present, steam was formed when the boxes were heated up, and small particles of the carbonaceous material were forced away, rendering the work more or less uneven. Regarding the comparative value of the case, he could not do better than show them some samples. In these, they would agree that the case was much closer than anything obtained with the solid system of carburizing in the period of four hours during which they had been soaking. The work was perfectly clean; and, as he had said, the great advantage was that they could carry on carburization until, if necessary, they had carburized the whole of the material, which was quite impossible with the other method.

Mr. PEARSON: With the old system, you can vary your hardening by simply altering the length of time?

Mr. WALTER replied that this was only the case up to a certain point.

Mr. PEARSON: With ordinary boxes, they are big enough, generally speaking, to put a large number of the usually small articles in one box. Can you treat a large number of articles in these retorts?

Mr. WALTER said that, to give an idea of what could be handled, he might tell them that a furnace was being built which would probably have a 10-inch lining made of silica or iron tube heavily copper-plated. This tube would be about 4 feet long; and the work would be suspended in small cages, so arranged as to rotate and move up and down at the same time.

Mr. H. JONES (Stourbridge): Is this in an experimental stage, or is it in commercial use in Birmingham?

Mr. WALTER replied that it had got rather beyond the experimental stage, because they had done actual work which had proved to be of practical value and had shown the process to be cheaper than the old method of solid carbonaceous material. The use of gas for this purpose was not, of course, by any means new. The carbon monoxide system had been employed in America for many years; and large quantities of armour plate had been carburized with carbon monoxide and carbon dioxide gas. But, strange to say, hydrocarbon gas had not been adopted here as the medium; and when such a gas was "on tap," it seemed there ought to be a big future for it in this connection.

COKE-OVEN MANAGERS' ASSOCIATION.

Visit to Hasland.

The members of the Coke-Oven Managers' Association paid a visit, on Saturday afternoon, to the coke-oven plant of the Hasland Coking Company, in conjunction with the Grassmoor Company's Collieries, near Chesterfield, Derbyshire. The party were met, on arrival, by waggonettes provided by the Hasland Company, and driven the few miles to the works.

AN ADDRESS BY MR. LEE.

On reaching the works, Mr. John W. Lee, the Coking Manager, assembling the visitors in the office adjoining the chemical laboratory, in a short address, outlined the features of the plant they were about to inspect [a detailed technical description of which appeared in the "JOURNAL," in February, 1915, pp. 519-22]. The whole of the plant, except the washery, is by the Otto Company. The washery is a Humboldt, and is very old and small. It had been established in days gone by, when there were about 250 beehive ovens, and washed coal entirely was used. There are no beehives now. Of the later plant, the original equipment, installed a little over eight years ago, was 50 Otto waste-heat ovens, giving an average of 5·1 tons of coke per oven, though 5·3 tons was sometimes reached. Further, with this plant an original set of three coolers and two ammonia scrubbers was put in. A little later, there was yet a further addition of ten waste-heat ovens; making a total of 60 of this type. About four-a-half years ago, 50 Otto ovens of the regenerative type were added; but no addition was made to the ammonia-recovery side of the plant. The two original ammonia scrubbers which were put in for the first battery of 50 remained to-day the only plant there was for recovering ammonia from the whole of the 110 ovens. They were hoping to obtain more some day, when the people who were responsible for getting things out quickly, under the magic class "A," made things go. The visitors would see, in passing round, the foundations which had been laid for a new ammonia scrubber. There were two ammonia liquor sprays, which were absolutely no good for removing the ammonia, but were very fine tar removers—perhaps the finest one could wish for. They did not, however, take out ammonia—in fact, they gave it up. With the original 60 waste-heat ovens there had been no benzol recovery. This was an addition put in when the final 50 regenerative ovens were built; so that with four benzol scrubbers the scrubbing plant was complete. The plant was perhaps a little unique in this matter, for there was no exhauster house, as they had no rotary exhausters. They had two Körting steam-jet exhausters—one in use and one off; so that the whole plant was under suction right away to the outlet of the benzol scrubbers. They used gas-engines entirely, utilizing the surplus gas in this direction. There were three 500 H.P. Westinghouse gas-engines running on purified coke-oven gas. The sulphate plant was old—like most things on the works. The old type of recovery was not yet, he contended, quite played out, as the visitors would see. The Company could still make sulphate—he meant, of course, the indirect-recovery system. The benzol plant was the Otto-Lucas type, with crude and rectified plant. They had had considerable difficulty during the past twelve months with their coke-conveying machinery. They had two quenchers and loaders, both of which were absolutely worn out. One quencher the visitors would be able to see working—it had been working for just over three weeks. It was the old case with a new cast-iron table—the old table had been of wrought iron, and was worn out. They were in hopes that the arrangement was a distinct move in the right direction. This was working upon the waste-heat ovens. On the regenerative ovens they were quenching the coke by hand entirely, and conveying it from the bench also by hand. The visitors would see thereby some of the difficulties under which the plant had had to be worked. The bench had been designed and used for a Goodall quencher; but, owing to its age and worn-out condition, the quencher on this side had had to be scrapped. At the same time, however, the work had to be carried on, because all the colliery depended upon it. They had had many periods of standing for a few hours—as long as 24 hours sometimes—for repairs; and the eventual result was that they lost their heat on the 50 waste-heat ovens, and had to close down for two days for fear of losing the heat on the regenerative ovens as well. Fortunately, they avoided this, and were able to start the colliery again and slowly get back their waste-heat ovens. The Company had already decided to put in a coke-car for service to the regenerative ovens; and the visitors would see some of the work in progress in connection therewith.

Mr. Lee concluded his remarks by saying that he hoped that when they got the conveyor car the comparative prices for dealing with coke on a quencher which is practically new and with a coke-car which is actually new may some day be of interest to the members of the Association. He could assure them his Directors and he would be quite willing to place these at the service of the Association if they are likely to be regarded as of use.

INSPECTION OF THE PLANT.

The visitors were then conducted over the plant in three parties, led by Mr. Lee, Mr. C. H. Oxley (the Manager of the Holmwood plant), and Mr. E. Wheatcroft (the Chief Chemist at Hasland). The visitors inspected the plant with deep interest, particularly in relation to the various difficulties which had had to be overcome. The guides described the undertaking in detail. In view of the very small washery, which does not provide sufficient washed slack to serve the charging of so many ovens, members were interested to learn that the slack obtained was mixed with crushed dry best coal direct from the colliery. The moisture in the mixture averages about 11 per cent. The mixture, though admittedly rather costly in material and in labour in crushing, made coke of very fine texture, and was most satisfactory. On a charge of 9 tons per oven, the regenerative plant produces an average of 6·4 tons of coke per oven. Several members were especially interested—as non-ammonia recoverers themselves—in the ammonia plant; and very detailed explanations were called for, and readily given.

A feature of the bye-product equipment on which Mr. Lee is to be congratulated, and in regard to which there were a good many expressions of envy, was the storage of benzol and fractions. There is very ample storage in eight tanks, each of 11,000 gallons capacity, which give the utmost satisfaction from every point of view. In the pump-house, the nine benzol pumps are driven by a gas-engine, with an electric motor as a stand-by if need be. Mr. Lee, however, mentioned that he did not like the electric drive because of the impossibility of satisfactorily regulating the speed of the pumps.

In the sulphate-house, questions were asked in regard to the disposal of the "devil" liquor resulting from the indirect recovery process. It transpired that the liquor is run through a pipe into an old tank outside, from which it is pumped along to the washery, and from there pumped on to the top of a hot spoil tip, where it practically evaporates.

THE COMPANY'S HOSPITALITY.

After the inspection of the works, the party were driven in the waggonettes to Chesterfield, where, at Everett's Café, one of the old town's quaintest buildings, an enjoyable repast had been provided by the Directors of the Hasland Company—Messrs. Barnes.

Mr. W. DIAMOND (Co. Durham), after expressing apologies for the absence of the President of the Association (Mr. George Chrisp) and of one or two of the Durham members, said the visit to Mr. Lee's plant had been most educative. They all realized very fully the difficulties and troubles one might look forward to when such plant was put down as that which Mr. Lee had had to handle. At the same time, there was no doubt they had learned by the visit some of these troubles and how to prevent the same thing in their own plants. The Association had hitherto visited plants where everything had been nearly new; and, to his own mind, it was really better for them to visit plants like that of Mr. Lee, where there were troubles in great variety, so that they could see the way in which they had been successfully met and overcome. They must all thank Mr. Lee for having been so free in explaining the problems and their remedies. They in Durham were very jealous of Mr. Lee in obtaining 1·65 per cent. of ammonia. They themselves were thankful when they got 1·1 per cent. On the other hand, they could show Mr. Lee "a bit in coke." Mr. Lee's benzol yield, also, was rather higher than that in Durham. They were running a little over 2 gallons; but he beat them by 3·75.

Mr. T. H. RILEY (Tinsley Park) moved a hearty vote of thanks to Mr. Lee.

Mr. J. A. WILSON (Staveley), in seconding, said that he had always found Mr. Lee to be one of the men who were valuable to an Association of their kind, because they were always ready to help others with the knowledge and information in their possession.

Mr. LEE, in response, said his Directors had been most willing to do everything possible to make the visit an enjoyable one, and any suggestion which he had made for the comfort of the party had been accepted at once. He was in complete agreement with the view expressed by Mr. Diamond—that it became a much more educative visit by their having seen a plant which had been running for some considerable time and having got right up-against any difficulties which had been encountered. He was sure they had been able to study some really interesting problems, and to see how they had been overcome, and others which were now being overcome. When the Secretary had asked him if the Association might visit Hasland, he had at first thought of putting off the visit for a few months until the place got more straight and the renewals were completed; but then he thought that to show a place while it was in course of change would be much more valuable than a later visit. Mr. Ernest Barnes, one of the Directors, he thought, would have preferred the visit when the plant was in a better condition; but he had agreed with him (Mr. Lee).

Mr. JAMES MARSHALL proposed a hearty vote of thanks to the Directors of the Hasland Coking Company for their courtesy and generosity in permitting the visit and for the way in which they had played the part of hosts.

The HON. SECRETARY (Mr. J. T. Price) having seconded the motion, Mr. LEE briefly replied on behalf of the Directors.

Formation of Area Branches.

A special meeting of the Council of the Association, together with representatives of coking districts in various parts of the country, was held last Friday evening, at Sheffield, to proceed with the preparation of a definite scheme for the formation of area branches, in accordance with recent instructions by the general membership. Representatives from South Yorkshire, West Yorkshire, Derbyshire, and Durham were present, and apologies were received from Cumberland, Staffordshire, and South Wales. The meeting practically drew up a scheme, only a few details being left over to a further meeting which will be held before the scheme is submitted to the members. It was mentioned that the Staffordshire members had had a meeting the previous evening. Several new members were accepted by the Council.

GAS FIRING IN ELECTRICITY WORKS.

In connection with a paper by Mr. W. W. Lackie, the Chief Electrical Engineer to the Glasgow Corporation, at the annual meeting of the Municipal Electrical Association last Thursday [see p. 690], in which the question of improving boiler-houses of electricity works was gone into in detail, considerable reference was made during the discussion to the question of introducing gas-firing in boilers in electricity works, which carried with it a revival of the schemes proposed from time to time for a closer association between the electrical and gas industries from this point of view.

Mr. J. CHRISTIE, the Chief Electrical Engineer to the Brighton Corporation, said there was one strong point to which Mr. Lackie had omitted to refer, and one which must have a most important bearing on the general design, lay-out, and operation of boiler-houses such as will be necessary to deal with the "super-stations" which they hoped to see dotted about the country in the near future, to "meet the universal supply of electricity." He referred to the question of firing boilers by means of gas instead of coal. Dr. Ferranti—and all credit was due to him—dealt most fully with this subject some years ago; and it had since been referred to by many other "disciples of progress" both in papers and articles in the lay and Technical Press, but so far with little practical result. The colossal power plants of the future with extra high-tension transmission, must be located on suitable sites outside their areas of supply where land is comparatively cheap; but with the large size turbine units which it will then be standard practice to instal, the difficulty would be to find accommodation to house the steam-raising plant within a reasonable radius of the unit which it has to operate. This would become more and more acute as their size increases—chiefly due to the large proportion of the total cubical capacity of the space available for housing the boilers, which, under present conditions, has to be allocated to coal storage, coal and ash handling plant, automatic stokers, &c., as distinct from the actual boilers themselves. Why not face this problem boldly, he asked, by altering the fuel supply system, with all its attendant disadvantages right away from the power-house proper, and on some suitable adjoining site provide coal-stores, retort-houses, and recovery plant for carbonizing the coal on the low-temperature process—thus extracting its maximum value—and lead the resultant gas as the fuel supply to the power-house by pipe lines? Greatly increased boiler capacity could then be installed per square foot of floor space. This could be housed in cheap, light, airy buildings. All dust, dirt, soot, and ash incidental to coal firing would be entirely done away with; and, due to the clean surfaces and simplicity of regulation, the maximum duty from the boilers could be continuously obtained with a minimum of labour, supervision, and stand-by loss. Such an arrangement would provide an adequate supply of coalite for use as fuel to meet all industrial and domestic requirements—thus solving the smoke problem in our large cities, and by the recovery of the rich tar, sulphate of ammonia, toluol, benzol, and other valuable residuals which are at present wasted, enable us to foster new chemical industries in our own country, and supply products for which before the war we were almost entirely dependent on Germany and other sources abroad. During the last few months he had had occasion to go into such a proposition, on quite a modest scale, for use in conjunction with their own works; and he felt so confident of its ultimate success that he was now most strongly urging his Committee to complete negotiations with the British Coalite Company, who proposed to co-operate with them in the scheme, to establish a plant capable of carbonizing in the first instance some 200 tons of coal per day. From this he hoped to generate, by means of the residual gas which they would contract to purchase upon the most favourable terms, approximately 30,000 units of electricity per day, at little more than one-half the corresponding cost for coal; and in his opinion the larger the scheme, and the higher the load factor, the greater would be the prospects of success for such a combination as he had attempted to outline.

Mr. C. WORDINGHAM said Mr. Christie had raised a question which he himself had gone into a great deal some sixteen years ago, but which he had had to turn-down because at the time it was hopeless to attempt to compete by gas with coal firing. Since then very great improvements had been made. The Bonecourt system of surface combustion had come into existence, and recovery plants had been developed; and for this reason he thought there was a great future on the lines of Mr. Christie's proposal. This pointed to a combination of interests which he had in the past strongly advocated, although he was afraid with a great deal of unpopularity—namely, a combination of the gas and electricity interests. They must not forget that, although electrical engineers were producing electrical energy cheaply, gas engineers were equally competent and keen on gasifying coal in the most economical way; and he still thought that in future, working on these lines, gas engineers would have to come in.

Mr. W. M. SELVEY (Sheffield) said that since the war, what had touched the public mind most was the question of bye-products from coal, and thereby the consumption of coke in the power station. While much nonsense was voiced by the Press upon this question, and a good deal of uninstructed information volunteered by their chemical and gas engineering friends, the fact remained that in the future the electrical industry would be the biggest coal buyer and coal user. With such large capital employed, the industry must, sooner or later, accumulate large reserve funds, part of which must be allocated for investigation and research in exactly the same way as was necessary in a manufacturing concern. He thought the time was rapidly approaching when the electrical power manufacturer would no longer be justified in looking to the manufacturer of mechanical and electrical apparatus for all investigation work, and for the analysis of the problems of generation for which he had in the past been largely responsible. In this respect electrical generation would have to organize itself as a manufacturing concern on the broadest possible lines. The attempt to co-operate with gas engineers is, he thought, doomed to failure. Gas concerns had largely reached their zenith; and their progress in the future lay almost entirely in specialization. They were unable to take up the general question of the utilization of fuel for the production of power. The prospect of large gas-driven stations appeared to be receding more and more; and the difficulties in the way of producing a satisfactory gas-turbine were so enormous that, unless some interest became strong enough to put down a sum of (say) a quarter of a million pounds for research on this question, it was very unlikely that anything at all would be done.

Mr. G. WILKINSON, the Chief Electrical Engineer of Harrogate, strongly supported Mr. Christie and Mr. Wordingham, but thought that one of the difficulties would be the quantity of coke which would have to be disposed of. If the company which was working with Mr. Christie would co-operate with him and sell the coke, well and good; but the electrical undertaking could not entertain anything of this description. He would suggest, however, that Mr. Christie might take into account the question of using the 60 per cent. of fixed carbon which was found in the coke, and by using it in his boilers reduce the coke right down to the ash. In this way he would improve his efficiency very greatly. He (Mr. Wilkinson) had hoped that something would have been said by Mr. Lackie with regard to his gas-firing scheme; but he had carefully left out of the paper any reference to it. The idea appealed to him, because of its greater cleanliness, absence of smoke, greatly reduced steam-pipe losses, and the great increase in the available heating surface—to say nothing of the greater flexibility of the fuel. Further, the bye-products should produce in revenue an amount equal approximately to 30 per cent. of the original cost of the coal in large plants, while in small plants it should amount to 10 per cent.

Bailie SMITH (Glasgow) said he had only been drawn into this discussion because of what had been mentioned as to the gas-firing of boilers. Mr. Wordingham had said that the subject would have to be attacked by joint action between gas engineers and electrical engineers; but the Corporation of Glasgow had anticipated this idea. Over two years ago, a Joint Sub-Committee, consisting of members of the Gas and Electricity Committees, agreed upon a joint experiment with regard to the gas-firing of boilers. This had been going on at one of the electricity works; the experiment being to convert the coal into gas and use it as a heating medium—getting at the same time the valuable bye-products which up to now electrical engineers had sent up their chimneys into the atmosphere. It was too soon to give any results; but he hoped by next year a paper on the subject would be read. Meanwhile, they were trying experimentally a new process. If it proved to be a good one, they would adopt it; but if it did not prove to be a good one, they would look out for some other process. Most encouraging and surprising results were being obtained in low-temperature carbonization, and bye-products were being obtained of much higher value than had been anticipated. Incidentally, they got the coke in such a form that it would burn in an open grate, and it gave every appearance of being an ideal smokeless fuel. If, however, they did not want to sell the coke, there was nothing to prevent it being burned in the boilers. Mr. Lackie had recently made an experiment with gas coke in his boilers and got good results. Hitherto the difficulty had been that the cost of gasifying the coal had been greater than the return from the bye-products; but there was every sign that the process now being tried would enable coal to be gasified at a very low price, so that the revenue from the products would exceed the costs of the capital expenditure upon the gasification plant.

The Institution "Life of Gas-Meters Research" Committee.—We understand that Dr. R. Lessing has resigned his position as Chemist to the Joint Committee of the Institution of Gas Engineers and the Society of British Gas Industries, who are inquiring into the various conditions affecting the life of gas-meters.

Imperial Gas Association of Japan.—At the fourth annual meeting of the Association, held during April in Osaka, after the formal business had been transacted, technical subjects were introduced to the notice of those present by Mr. R. Mitsugi (Engineer of the Tokyo Gas Company) and Mr. G. Kuwata (Engineer of the Osaka Gas Company). In the course of the subsequent banquet, Dr. T. Takamatsu (the President) referred to the success of the meeting, Mr. R. Imanishi (Director of the Osaka Gas Company) spoke on the subject of gas sales, and Mr. H. Ikebukuro (President of the Osaka Mint) on the industrial uses of gas. The two following days were devoted to a series of visits, among the places inspected being the Osaka Mint, where many gas-furnaces are in use.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Alien Enemy Members of the Institution.

SIR,—I was interested to read the letter from Mr. S. O. Stephenson, advocating the exclusion of alien enemy members of the Institution, but fail to see what argument he advanced to support such action.

The only point which could suggest the exercise of our "dignity and patriotism" is the question of those particular members who have attended the special and private meetings in connection with the war, and might have communicated the results to their respective Governments.

Would it not be well, before the Institution commits itself, to ascertain who are these alleged members who have come to our meetings, prying into our secrets, in order to undermine our security and benefit our enemies?

I have looked carefully through the list of ordinary members, and can find only three names affected—viz., E. Körting, of Berlin, L. Körting, of Hanover, and R. Lessing, of London.

As the latter is the only member of alien enemy birth who could possibly attend meetings at the present time, it appears that he is the one who would feel the whole force of the Institution's patriotic fervour, should the suggestion be adopted. The fact that he has been appointed to investigate the conditions which affect the life of meters and is, moreover, the Research Chemist to the Joint Committee of the Institution and the Society of British Gas Industries, would, I consider, under such circumstances, place the Institution in a very unenviable position.

If any useful purpose can be served by eliminating these names, by all means let it be done; but I do hope we shall not allow the Institution to humiliate itself by any spiteful action.

G. WILLIAM TOOLEY.

Rochdale Road Gas-Works, Manchester,
June 23, 1916.

Sulphate of Ammonia.

SIR,—In your issue of the 6th inst., you published a letter from Mr. H. E. Jones on the above subject, in which he twitted us with having failed to point out that nitrate of soda is more easily washed out of the soil than sulphate of ammonia. We immediately wrote to Mr. Jones, pointing out that this was not the case, and sending him some of our pamphlets in which the subject is referred to; and we rather expected he would in consequence send you a further communication on the subject. As he has not done so, we shall feel obliged if you will give us the opportunity of pointing out that we have persistently been drawing attention to this important advantage of sulphate of ammonia over nitrate of soda for many years, as the following quotations from our pamphlets will show.

May, 1911.—"*Position of Sulphate of Ammonia in Agriculture.*"

Experiments at Rothamsted proved . . . that whereas nitrate of soda was washed through into the drain water, the nitrogen of sulphate of ammonia . . . remains fixed in the soil; being rendered in some fashion insoluble in rain water.

May, 1912.—"*Artificial Manures for Farm, Small Holding, and Garden.*"

Unlike nitrate of soda, sulphate of ammonia is not liable to be washed through or out of the soil in wet seasons.

1914.—"*Manure Richest in Nitrogen.*"

When applied to the land, sulphate of ammonia becomes fixed in the upper layers of the soil and is absorbed by the crop as it is required. It is well known that nitrates are readily washed out of the soil, and the wastage from an application of a nitrate manure must often be a serious loss to the farmer.

Many users compare the readily soluble nitrogenous manures with sulphate of ammonia; but if the latter is applied at an earlier stage, . . . the loss of nitrogen through the drains is entirely eliminated, thus avoiding the waste of much valuable plant food.

1915.—"*Economic Manuring.*"

Sulphate of ammonia may be deemed the most economical form [of nitrogen] . . . being less liable to be washed through or out of the soil in wet seasons.

Unlike other nitrogenous fertilizers, sulphate of ammonia is not liable to be washed through or out of the soil in wet seasons.

A. G. LEIGHTON, Home Manager.
Sulphate of Ammonia Association.

84, *Horseferry Road, S.W., June* 19, 1916.

Mr. Bowden's Coal Economy Plan.

SIR,—I do not know whether to feel gratified or otherwise with the comments made in "Electricity Supply Memoranda" which appeared in your issue of the 6th inst. The opening remarks lead one to infer that at least some of my writings have been appreciated by the writer, and, emanating from "our friend the enemy," are, therefore, more than appreciated by myself. I am also extremely glad that my absence from town prevented me replying immediately to his very caustic remarks, because I have experienced the still greater pleasure of reading his effusion in your issue of the 13th inst., when, impatiently assuming that the badger refused to be drawn, he proceeded to bait the badger.

I have some recollection of reading—I believe it was in the previous week's "Memoranda"—that a more friendly feeling between the gas and the electrical industries was desirable; and I took it that the olive branch was being held before the eyes of the electrical world. My surprise at being likened unto the German Fleet engaged upon some unknown enterprise in the North Sea may be readily surmised. However, from my retirement in the "East-end Kiel" I have not as yet proclaimed to the world any news relating to a smashing victory over the enemy. Indeed, I was not aware that my simple remedy for a desperate national malady would have been construed into even a mild attack upon the "enemy." But it appears, from the storm of abuse and misconstruction that has arisen, that my contribution to the Electrical Press on fuel economy is looked upon as an attack by a veritable flotilla of destroyers upon that impregnable British bulwark of the Empire—the gas industry. I may say, however, that the writer of the "Memoranda" is the first to cry "enemy." Personally, I have no antagonistic feeling towards the gas industry. I am convinced, in my own mind, that gas has served a very useful purpose in the past, and will continue to occupy a sphere of utility in the future when the gas undertakers realize that they must work out their own salvation—not by fighting the electrical industry, which is destined to supersede them as distributors of power, light, and heat, and not by adopting the Germanic methods of your writer, who, after a short conflict of ideas, proclaims to the world at large, without waiting for a reply, that the "enemy" has taken refuge in his base—the "East-end Kiel"—at Poplar, and dares not venture out into the open again either to defend or to attack.

In my letter of May 27, I stated approximate facts, which are incontrovertible. I do not propose to discuss whether, in actual practice, a brake-horse-power-hour can be obtained from 16, 20, or 25 cubic feet of gas; but I am not going to accept test figures of plant taken under ideal conditions of load and in perfect state of repair as applicable to actual work, either in the case of gas, electricity, or steam. I stated an approximate figure which is probably more correct in actual practice, as proved by the gas-meter, than the ideal figures quoted by your writer. At all events, I certainly prefer to take the experience of numerous users of electrical energy for motive power who have discarded the use of gas because of the high consumption of gas-engines. I am prepared to stand by my "one watt per candle power lamp" standard which your writer described as a "fiction." Probably he has similar ideas to Mr. Fisher, the Electrical Manager of Tottenham Gas Company, who, in the "Electrical Times" for June 1, states that "after their first brilliancy is past, 1¼ watts per candle power are required." He is evidently under the impression that electrical energy can be regulated by tap similarly to gas. But I do know from experience that, after a few hours' use of the average quality mantle, the consumption of gas is increased, and, more often than not, the use is increased without a corresponding increase in the volume of light.

However, all this is not to the point. You have assumed—and not only you, but Mr. Fisher, Mr. Milne Watson, of the Gas Light and Coke Company in the "Electrical Review" for June 9, and your contemporary the "Gas World" in its issue for June 3—that I overlooked the very valuable bye-products of coal which gas undertakers reclaim, and the fact that electricity undertakers burn their fuel wastefully. This has nothing to do with the matter under discussion. The Board of Trade called for a general reduction in the use of fuel by 10 per cent. in order to ship to our allies the quantity saved. I should like to know of what value the bye-products of coal shipped abroad can be to our country. I pointed out that, by using electricity for lighting and power purposes instead of gas, about 70 per cent. saving could be effected in the case of the former and 50 per cent. in the case of the latter—stating, at the same time, that the greatest field for saving lay in the latter supply. Curiously enough, your contemporary questions my sense of proportion, "for he gets so tied up in his figures that he assumes 50 per cent. to be greater than 70 per cent." I know of no better authority on this subject than the Postmaster-General, who informed the House recently that proportionate figures are very misleading, giving, as an illustration, the case of a Highland Regiment in which 50 per cent. of the teetotalers were ill; but he allayed the effect of this startling news by mentioning that the regiment contained only two teetotalers! I also stated that the output of gas varies from 10,000 to 13,000 cubic feet, according to the quality of coal and the retorts employed; but I took the 13,000 cubic feet standard as being the highest output attainable by gas undertakers, and felt justified, therefore, in taking, as a comparison, the consumption of steam by modern turbine plant. Three pounds of coal per unit of energy generated is a fairly moderate estimate of that required in modern generating stations. Your writer made a special point of "the best conditions of plant and fuel" in the case of electricity without taking cognizance of the fact that I had used the best conditions of gas plant and fuel for the sake of comparison.

Now I am prepared to admit all that has been said about burning coal wastefully in electrical power houses. I am convinced that the future holds out the prospect of electricity undertakers "putting coal through the retort as a prelude to obtaining from it the motive power for the generation of electric energy," as suggested by Mr. Milne Watson. But does the gas industry realize what this means? Not only would electricity continue to be a competitor for the supply of power, light, and heat, but also in all the markets for bye-products of coal. The output of electrical energy is increasing enormously year by year, whereas the output of gas is making slow progress. In the near future the latter will begin to decline, particularly so when electric cooking apparatus has reached a more perfect stage. Engineers are already turning their attention to the distillation of coal, and the consequent additional revenue from the sale of bye-products. With the decline in the output of gas, not only will the saleable quantities diminish, but the value will decrease on account of the competition by the electricity undertakers.

It would be far better for the gas industry to realize what the future holds out for the industry if it persists in combating the advance of electrical science by misrepresentation, ridicule, and abuse. There is room in the industrial world for both industries; but it must be recognized, and at once, that electricity must be employed as the medium for distributing power, light, and heat, and that the gas industry must devote its energies to the scientific and economic recovery of all the products of coal. The war has shown us the necessity for conserving our coal supplies. Coal is the wealth of this country, and its power will last only so long as an abundant supply of coal is obtainable.

The universal use of electricity would bring about a saving of 70 per cent. of the coal now used for industrial and household purposes in this country, which means that its power and prosperity would last five times as long as it will do if the present wasteful methods of consuming coal are persisted in.

I may say that, just prior to the outbreak of war, a colleague and I attempted to organize a "society for the development of the economical distribution of the products of coal," which should be composed of representative men of all interests involved. My idea was that the composition should embrace one or more of the following professions or callings—viz., chemists, electrical engineers, gas engineers, hot-water engineers, boiler makers, turbine makers, gas-engine makers, &c., and representation from Parliament and the London County Council. Mr. Alexander Duckham, the well-known chemist, interested himself in the matter; and he approached Sir William Ramsay with a view to accepting the Presidency for the first year, to which, I believe, he was favourable. Unfortunately, before the scheme could mature, the war broke out, and it was therefore allowed to drop.

The Board of Trade circular-letter clearly proves the necessity of some such organization being constituted with authoritative powers. Whether or not this will become a product of the war remains to be seen; but it would, in my opinion, be of greater ultimate advantage to the gas industry in general to consider the possible amalgamation of gas and electrical interests in preference to a continuance of the present policy of misrepresentation and ridicule of its most powerful competitor.

J. HORACE BOWDEN, Chief Engineer.

Electricity Works, Bromley-by-Bow, E., June 20, 1916.

[Mr. Bowden in the foregoing letter has given us a mass of postulation, prophecy, and so forth, and perhaps has—at any rate, we hope so—exhausted himself in these respects. If so, probably he will now address himself *seriatim* to the comments made, and the questions raised, in the "Electricity Supply Memoranda" for June 6, and will attempt to justify his suggestion that the country would be in a better position by stopping the carbonization of coal now required for the production of gas, coke, benzol, toluol, raw materials for dyes, sulphate of ammonia, and numerous other essentials, and turning the gas business over to the electricity industry—not omitting to deal with the relative thermal efficiency of the coal carbonizing process as practised on gas-works and the value-destroying as practised in electricity stations. Mr. Bowden's original idea was to put before the Board of Trade a remarkable plan that was to serve their purpose of saving coal for export to neutral countries; but he forgot to explain how the country was to fare in respect of the essentials required for the war and industry, on the capacity for production being reduced as he proposed. We invite him to get to this matter, as delay is dangerous, if his scheme is to be adopted.—ED. J.G.L.]

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

The following further progress has been made with Bills:

Bill read a second time and committed: Tynemouth Corporation.

Bills reported, with amendments: Folkestone Gas, Uxbridge Gas, Wakefield Corporation.

Bill read the third time, passed, and sent to the Commons: Newcastle-upon-Tyne and Gateshead Gas.

Bill returned from the Commons with the amendments agreed to: South Metropolitan Gas. [This Bill is now waiting the Royal Assent.]

Petition for Bill.

Last Tuesday, the Conway and Colwyn Bay Joint Water Supply Board petitioned for leave to introduce a Bill to authorize the construction of a reservoir by means of a dam across the Afon Ddu, and the taking of water by the Board and the Aluminium Corporation, Limited, for power and other purposes. The Bill was read the first time, and referred to the Examiners.

HOUSE OF COMMONS.

The following further progress has been made with Bills:

Bill read the first time, and referred to the Examiners: Newcastle-upon-Tyne and Gateshead Gas [Lords].

Bills read a second time and committed: Aberdare and Aberaman Gas [Lords], Local Government Provisional Orders (No. 7).

The Lords amendments to the South Metropolitan Gas Bill were considered last Tuesday, and agreed to.

Petitions have been presented against the following Bills: Colchester Gas [Lords], by the Colchester Corporation; South Eastern and London, Chatham, and Dover Railways [Lords], by the Gas Light and Coke Company, South Metropolitan Gas Company, and the Wandsworth, Wimbledon, and Epsom District Gas Company; Yeadon Water [Lords], by the Wharfedale Rural District Council.

Standard of Calorific Power Bill.

The second reading of this Bill was deferred last week until yesterday (Monday); but up to the time of going to press, we have been unable to ascertain whether or not it was read. Two notices of motion for the rejection of the Bill appear on the Order Paper. Mr. T. M. Healy is to move: "That this House declines to proceed further with a measure which would depreciate the illuminating power of gas supplied without making any provisions for a corresponding reduction in the price charged;" and Mr. King: "That it is inexpedient to proceed with this measure, which is not emergency legislation, and has no time-limit for the period of the war."

Gas Undertakings Returns.

On Wednesday last, on the motion of Mr. Pretyman, the order [July 28, 1915] for returns relating to all authorized gas undertakings in the United Kingdom for the year ending Dec. 31, 1914, in the case of gas companies, and March 31, 1915, for local authorities, was read, and discharged.

LEGAL INTELLIGENCE.

LAW OF LIABILITY FOR GAS SUPPLIED.

HIGH COURT OF JUSTICE—DIVISIONAL COURT.

Tuesday, June 2.

(*Before Justices* DARLING, AVORY, *and* HORRIDGE.)

Rex v. Beal and Malvern—ex parte Lea Bridge Gas Company.

Mr. PHILLIPS said he appeared for Mrs. Malvern to show cause against a rule obtained by the Gas Company on March 31 calling upon the Justices of Essex to show cause why they should not state a case for the opinion of the High Court [*ante*, p. 92]. A summons was taken out by the Company to recover £6 8s. 1d. from Mrs. Malvern for gas supplied to premises at which she resided. When the rule was obtained, affidavits were read proving that gas was supplied in the ordinary way by meter to Mr. A. Wood, of No. 50, Linford Road, and that on March 16, 1915, the meter inspector reported that Mr. Wood was dead, whereupon the name was altered to Mrs. Wood, and she paid the account for gas supplied. This statement was disputed, and it was found by the Justices that it was not correct. The husband died on March 8, 1915, the widow took out letters of administration, and in August, 1915, she married again, from which time the husband became tenant of the house in which the lady had continued to reside.

Mr. Justice HORRIDGE said the accounts were rendered against the husband, and the widow paid as administratrix.

Mr. PHILLIPS said that was so; but the estate was not consuming the gas. Before the Magistrates the point was taken, on behalf of the lady, that the meter did not register correctly, and that a larger amount was claimed than was actually due. The case was adjourned so that the meter might be tested; and the new husband offered to pay two guineas, which he said was the amount of the gas consumed. The amount due at Christmas was not paid, and this was part of the sum claimed.

Mr. Justice AVORY: In which capacity did the Gas Company sue her—as administratrix or as Mrs. Malvern?

Mr. PHILLIPS: As Mrs. Malvern.

Mr. Justice AVORY: How do they make out that the husband is the consumer?

Mr. PHILLIPS said he could not answer the question.

The affidavit of Edward John Beal, a Justice of the Peace, was read by the officer of the Court. He said that on March 1 complaint was preferred by the Gas Company for gas supplied to No. 50, Linford Road; and it was admitted that the contract was made between the Gas Company and A. Wood, that since the death of A. Wood Mrs. Wood had married again, that no fresh contract had been entered into with Mrs. Malvern, and the Justices, finding as a fact that there was no contract between Mrs. Malvern and the Gas Company, dismissed the summons.

Mr. Justice DARLING asked on what ground the Company had obtained the rule.

Mr. CAUTLEY said it was upon the ground that the matter did not rest on contract but on Statute, and that the lady having had the gas was bound to pay for it.

Mr. Justice AVORY asked whether there was not an implied contract to pay for the gas supplied.

Mr. PHILLIPS thought there was; and there being a question whether or not the lady was the person supplied, the Justices had found that the lady had not been supplied with gas, but her husband had been.

Mr. Justice HORRIDGE: It appears from the affidavit of the Justices that no one is going to pay for the gas consumed.

Mr. Justice AVORY observed that the only point for the Court to consider was whether a case should be stated, and therefore it was for applicant to show that the application was frivolous.

Mr. PHILLIPS submitted that the claim was a frivolous one. No claim was made against the lady, and the Christmas demand was not made against Mr. Wood—in other words, the Company treated the lady as representing the estate of her husband.

Mr. Justice HORRIDGE thought if the Court directed a case to be stated the facts would be properly set out. If it was known a man was dead and the Company went on supplying gas to the administratrix, the remedy was against that person.

Mr. CAUTLEY said it was a question of law whether the lady was the consumer.

The COURT made the rule absolute for the Justices to state a case.

Street Lighting in Bristol.—A suggestion to dispense with the use of the street-lamps during the period that the Summer Time Act is in force was referred to the Works Committee at Bristol. The City Engineer reported that this course would result in a saving of £800; but the Committee resolved that no action should be taken. It was stated that one thing which influenced the Committee in coming to this decision was the difficulty in dealing with the lamplighters.

MISCELLANEOUS NEWS.

COLCHESTER GAS-WORKS PURCHASE QUESTION.

Adverse Vote of the Town's Meeting.

The question of the advisability of further opposing the Colchester Gas Company's Bill and of purchasing the undertaking, which have more than once been discussed by the Town Council, was last Saturday week submitted to a meeting of the ratepayers convened by the Corporation.

The MAYOR (Mr. A. G. Aldridge) took the chair, and opened the proceedings by pointing out that the Company had promoted a Bill for the purpose of altering their status and acquiring further powers. The majority of the Council did not approve of the Bill, and especially disapproved of some of its clauses; and they desired to have a purchase clause inserted, to enable the Corporation to buy the undertaking.

Councillor WALLACE moved a resolution expressing approval of the action of the Council in opposing the Bill, and authorizing them to take such other steps as they might deem necessary with regard to the purchase clause and other matters in the Bill which they considered detrimental to the interests of the town. He outlined the history of the Gas Company since its formation in 1860, with a capital of £20,000. In December, the Council formed a Committee to look into the matter, and they found, among other things, that the Company had stopped away from Parliament for forty years; that their capital powers were exhausted twenty years ago; and that £40,000 was taken from revenue for capital purposes, and, therefore, out of the pockets of the consumers, who consequently had to pay a higher price for gas than they should have done. The overcharge for gas was clearly shown in the evidence given before the House of Lords Committee, and that the maximum dividend had been paid for forty years. The interest of the shareholders having been so safeguarded for so many years, the only remaining interest was that of the consumers, which was to get their gas as cheaply as possible. The time had now come when their interests would be best served by taking the matter into their own hands. A large floating capital of £11,000 had been accumulated, income-tax to the amount of £6200 had been illegally paid, and many other things had happened which were detrimental to the consumers. These matters having been considered by the Council, they unanimously decided to petition against the Bill, and ask for the inclusion in it of a purchase clause. This was the vital point, as they were firmly convinced that the consumers' interests were best in their own hands. He explained at some length the bearing of the purchase clause, with regard to which he pointed out that the Council had declined the invitation of the Directors to a meeting, because the Directors refused to concede the purchase clause—they holding the view that only details of the Bill should be discussed. He complained of the unfortunate attitude taken up by the House of Lords Committee in refusing to hear evidence of mismanagement and other irregularities. They only considered the interest of the shareholders; and the only evidence they said they would listen to was the evidence of the actual consumer himself. With regard to the Company having promoted the Bill during war time, he contended that there was no occasion for it. Dealing with the financial aspect, he saw that, with the change from a maximum dividend to a sliding-scale Company, there was bound up the question of a standard price. He urged that they should not be satisfied with the present standard price of 3s. 3d.—it should be 2s. 9d.—and that it was of the utmost importance to fight in the House of Commons the standard price and for the purchase clause and the reduction of capital. There were to-day 7793 consumers—2193 ordinary and 5600 slot meters. Therefore the future was vital to the small householder. He held that the slot consumer, in being charged 3s. 10d., had a grievance. All municipalities showed in their gas undertakings reduced price and profits—and all arrived at after payment of interest and sinking fund.

Councillor OWEN WARD, in seconding the resolution, said he did so as a consumer and not as a member of the Council. He wished the meeting not to lose sight of the fact, which was made very plain before the House of Lords Committee, that no less than a £15,000 reserve fund had been piled up by the Company. This ought to have been distributed in the lowering of the price of gas to the consumer. One of the conditions in the Act of Parliament under which the Company carried on their work was that there should be no reserve fund. Notwithstanding this, they had heard what had happened. They had also heard that income-tax had been paid out of revenue. This, again, was quite an illegality. In reading the account of the proceedings before the House of Lords Committee, one almost stood aghast at the idea that a Committee of that importance, when these facts were brought before them, simply waved them aside, saying: "These things are in the past; we are legislating for the future." He contended that when an Act of Parliament was granted to any public company, every condition laid down in the Act should be adhered to honourably and to the very letter. Otherwise what good was the House of Commons at all?

Mr. T. H. BAKER said the Council had already quite as much as they could do—to do it well. He was not an enthusiastic believer in municipal trading. Municipal management always had a fatal tendency to make the consumer pay the piper, and, after having made the consumer pay through the nose, the municipality boasted about reducing the rates. They would always find that the chief advocates for the purchase of gas companies were large ratepayers who generally were consumers of little or no gas. There was a talk about sharing profits. Why, this very Bill provided that the working-class employees of the Company should share the profits; but he had never heard of the Colchester Corporation sharing the profits of their trams or of the electric works. He was opposed to the resolution for another reason—he was sure it was not for the good of the town that gas and electricity should be in the same hands. While the Gas Company competed with the municipal electric works, both were put on their mettle to do their very best for their respective consumers. He did not think the Colchester electric lighting works afforded an inspiring example. The public did not know what the loss on them was last year.

Mr. READ, who stated that he represented 3000 trade unionists in Colchester, supported the resolution; and, in reply to a remark that the gas-works employees were better paid than the men working under the Corporation, he said it was because they were better organized.

Mr. H. GEOFFREY ELWES said he had come to the conclusion that no businesslike reasons for acquiring the gas undertaking had been advanced. He pointed out that all the shareholders in the Company received was 4 per cent. on their money. The 10 per cent. talked about was a dividend on the nominal capital, and not on the money invested by the shareholders. So far as he (a shareholder) was concerned, he did not mind financially whether they took over the undertaking or not.

Mr. LOOMES urged that before marking their voting papers ratepayers should consider whether this was a fit time to undertake an appointment that would involve not only immediate heavy expenditure in application to the House of Commons, but which in twelve months' time might cost another £600 or £800 to promote their own Bill. He declared that the Chairman of the House of Lords Committee was not unfair, as had been said, but was considerate of the ratepayers' interest. He was present at the enquiry himself, and spoke from his own knowledge.

After further discussion, the resolution was put, and lost by 31 votes —157 for and 188 against.

At a subsequent special meeting of the Town Council, it was decided to fix the corporate seal to a petition to the House of Commons against the Gas Company's Bill.

STOURBRIDGE GAS DEPARTMENT.

In his Eleventh Annual Report, dealing with the working of the Stourbridge Corporation Gas Department for the year ended March 31, Mr. Charles H. Webb, M.Sc. (the Engineer and Manager), says that the sales of gas by both ordinary and prepayment meters show increases which are substantially greater than the amount lost by reduced public lighting, leaving the sales under all headings about 2,000,000 cubic feet more than last year. As the total amount of gas made is only slightly greater this year, this means that the gas unaccounted for has been further reduced by over ½ per cent. On revenue account, the income is over £3000 to the good; but this increase is more than absorbed by the high price of coal. There are, however, much improved returns from residuals; and the balance carried to the profit and loss account is slightly better than last year, amounting to £12,321. Owing to the high price of coal, the return on residuals, compared with coal cost, is less, being 58·58 per cent. The price of gas has been advanced twice during the year; the total increase for lighting and power supplies being 4d. per 1000 cubic feet, while the quantity supplied by prepayment meter for 1d. has been reduced 1 cubic foot.

After making the usual deductions of income-tax, annual instalments, and interest, the surplus is £3544; being an increase of £316. Expenditure on new work has been cut down as low as possible; but everything has been done which was necessary to keep the works thoroughly efficient. The second section of oil-gas plant was erected and put into action; and payment for it was made from the contingency fund. During the year, there have been fixed 48 meters, 174 cookers, 2 gas-engines, and 175 gas fires, geysers, and heaters.

The working statement shows that the total make of gas was 257,029,000 cubic feet, of which 7·41 per cent. was unaccounted for. The make of coal gas per ton carbonized was 13,095 cubic feet, and the quantity sold 11,848 feet.

OLDHAM GAS-WORKS ACCOUNTS.

In his report to the Oldham Gas Committee, dealing with the accounts for the year ended March 25 last, Mr. Arthur Andrew (the General Manager) says the gross revenue for the twelve months amounted to £232,370, and the gross expenditure to £175,938. There was thus a balance of £56,432 to carry to profit and loss account. The net profit on the year's working is £26,624. Taking into account an amount of £7500 paid to the borough fund, and £1650 depreciation on cooking-stoves, there was a balance on the profit and loss account on March 25 of £17,474.

There was an all-round increase in the price paid for coal of 4s. per ton and upwards in new contracts entered into after May, 1915, to meet which the price of gas had to be increased 6d. per 1000 cubic feet. The net price realized per 1000 cubic feet of gas sold during the year was 2s. 3·36d., as compared with 1s. 10·33d. in the year previous. The consumption of gas by street-lamps has been greatly restricted; and generally where a portion of the lamps are lighted, they have been extinguished before midnight. The receipts for gas so used have in consequence fallen from £7630 in the previous year to £3973, though the price of gas has been increased.

The number of men from the department who had joined the Colours up to March 25 was 137; and the amount of allowance made to such men during the year was £3602. The amount of payment fixed by the Corporation is 10s. per week for single men, and a maximum of 16s. per week for married men, The amount of bonus paid to men who remained at work and were in receipt of a weekly wage up to 31s. 6d. per week was fixed at 2s. per week per man, and to those in receipt of 31s. 6d. per week and not more than 45s. per week 1s. 6d. per week per man. The total sum paid up to March 25 from the date when the bonus was agreed upon was £1099.

The quantity of gas manufactured during the year was 1,636,006,000 cubic feet, against 1,636,436,000 feet in the preceding year, being a decrease of 430,000 feet. There were used in its production: Coal, 119,813 tons; gas oil, 102,789 gallons; and pitch, 293 tons. The

average quantity of coal gas made per ton of coal carbonized was 13,166 cubic feet, as compared with 12,510 cubic feet in the previous year. The gas unaccounted-for has been 116,588,300 cubic feet, or 7·12 per cent. of the quantity made. The average calorific value of the gas supplied was 559 B.Th.U.

The total number of meters fixed on March 25 was 55,998, of which 9944 are of the prepayment type. The actual number of consumers was 51,383. The net increase in the number of cooking stoves and grillers fixed during the year is 452. The total number in use on March 25 was 23,940, excluding stoves owned by consumers. There has been a decrease in the quantity of gas consumed in houses and shops of 37,321,700 cubic feet, and an increase of 98,717,200 cubic feet in mills and workshops—mainly caused by the making of war munitions.

Pitch has been used for carbonizing purposes, not only with the object of economizing coal, but also to assist tar distillers and the Corporation by taking tar off the market, and thereby arresting a further fall which had taken place in the price. The amount of pitch purchased for the purpose of storing is 3263 tons, of which quantity 1613 tons is stored at the works of the tar contractors. Efforts have been maintained to produce as much toluol as possible for Government requirements, though it has been necessary to reduce the illuminating power; but in so doing the Corporation have been troubled to a greater extent than usual by the deposit of naphthalene in the mains and service-pipes. It was not thought advisable to insure the different gas-works against air-raids. The estimated amount of premium for such insurance was over £1000, exclusive of street-mains; and it was considered that any damage that might be caused was problematical, and the amount in the reserve fund could be used towards making good such damage.

MIDDLESBROUGH GAS UNDERTAKING.

Supply of Coke-Oven Gas.

To the members of the Middlesbrough Corporation Gas and Electricity Committee last Tuesday, the Mayor (Mr. Joseph Calvert), who is Chairman of the Committee, gave a short survey of the progress of the gas undertaking. He said the Corporation began to take coke-oven gas in October, 1914; and the supply had gone on without a single hitch, until two days last month, when an accident interfered with it, and it became necessary to put the water-gas plant into operation. The plant manufactured 400,000 cubic feet of gas; but the coke-oven supply was soon in working order again.

During the two years ended March 31, a substantial improvement had been secured. Last year, the leakage was 3·4 per cent., and the previous year 2·7 per cent. Prior to this, leakage was 6 per cent. A saving of about £560 per annum had been effected owing to the better attention to mains, &c., by the employment of more persistent methods of testing; and this was largely to the credit of the management.

Approximately, the profit for the year was £29,344. This was by far the largest gross profit that had been made. The net profit amounted to £10,412. The figures were better than he had forecasted a year ago, and were satisfactory, inasmuch as the ratepayers had not been called upon to pay more for gas, as people in many other towns had had to do. He also reminded them that from April 1 next the price of gas to the newly amalgamated district of North Ormesby would be reduced, which would mean a lessened income of about £1000 next year.

GAS PROFITS AT COVENTRY.

Coventry is able to register a record actual increase in the use of gas, as the result of the past year's operations; the output having been 15 per cent. larger than in the preceding year—1,322,038,000 cubic feet, as compared with 1,153,642,000 feet. Thus if the growth of demand is maintained, extensions at the new Foleshill works will be called for next winter—eight years after their construction, instead of twenty years, for which time the plant was designed to suffice.

Coal last year cost £98,593, compared with £69,229 the previous twelve months. The total expenditure was £166,859, against £128,768; while the income was £215,798, compared with £165,746. The war bonus absorbed £1404, and allowances to dependants of employees on active service £1653. The accounts show a gross profit of £48,938; and there is a net profit of £15,473, to which has to be added a sum of £5084 brought forward, making the available surplus £20,557. Having regard to the abnormal conditions which exist at the present time, and to the certainty that there will be a still further increase in the working costs during the year, owing to the rise in the price of coal and all other materials, the increase in the rate of interest on loans, and income-tax, also the excess profits tax, the Gas Committee recommend that the available surplus be applied as follows: (1) That £5000 be paid over to the general district fund in aid of the rates; (2) that £2000 be set aside to meet the balance of the loss of capital (which loss was estimated at £67,000) consequent upon the abandonment of plant at the old works; (3) that £13,557 be carried forward to the next account.

Reconstruction of the Walsall Holder.—Early last year, the Walsall Town Council entered into a contract with Messrs. Clayton, Son, and Co., Limited, of Leeds, for the reconstruction of No. 4 gasholder, for £11,396. Owing to the abnormal conditions caused by the war, the carrying out of the work had subsequently to be deferred until 1917; and it was felt to be doubtful whether the work could be executed even then. The Gas Committee have therefore been in negotiation with the firm, and have had before them a joint report by the Town Clerk and the Gas Engineer (Mr. B. W. Smith) on the subject. In view of the circumstances, the Committee now recommend the cancellation of the contract, and the acceptance of Messrs. Clayton's offer of £300 for strengthening the holder.

MASSACHUSETTS GAS COMMISSION REPORT.

The Thirty-First Annual Report of the Massachusetts Gas and Electricity Commission gives details of the operations of seventy gas companies during the year ended June 30, 1915.

Six of the seventy gas companies failed to earn expenses, compared with five in the previous year; and the total of companies not earning dividends was increased by one (to fifteen) during the twelve months. The actual valuation of all the companies is $65,856,000, compared with $59,690,400 in 1914. The 52 gas companies paying dividends distributed $3,960,002—an average rate of 8·9 per cent. on their capital stock. The actual surplus of the companies, according to the June 30, 1915, balance-sheet, was $8,077,836, or 17·79 per cent. on the capital, compared with $7,614,011, or 18·9 per cent., in the previous year, and $7,891,268, or 20 63 per cent., in 1913. Seven companies reduced the price of gas during the year. The average price paid by consumers for coal was $0·851 per 1000 cubic feet, which compares with $0·85 in each of two years previous, and $0·857 in 1912. Ten years ago the average was $1·05; and in 1886 it was $1·72.

Consolidated Statement of Seventy Gas Companies.

	1915	1914	1913
Income	$15,342,889	$15,051,135	$14,091,981
Expenses	11,069,125	11,291,059	10,112,265
Net profit	4,273,763	3,760,076	3,979,717
Surplus after dividends, &c.	154,851	*206,259	*6,121

* Deficit.

Only one electric corporation failed to earn expenses, contrasted with five in 1914; but eleven did not earn sufficient to pay dividends, compared with fourteen. The 43 dividend-paying companies distributed $4,004,108, which is a rate of 11·57 per cent. on the capital stock, and compares with $3,503,404 and 10·22 per cent. respectively in 1914. The actual surplus of the electric light corporations as on June 30, 1915, was $5,092,244, equivalent to 12·84 per cent. on the capital, and compared with $4,675,791 and 13·51 per cent. respectively in 1914. In 1913, the surplus was equivalent to 12·22 per cent. Seventeen companies reduced the price of electricity for commercial use, compared with 21 making reductions in 1914.

Company and Private Electricity Plants.

	1915	1914	1913
Income	$17,767,913	$16,771,413	$15,128,212
Expenses	10,734,054	10,025,352	8,995,055
Net profit	7,033,858	6,746,061	6,133,157
Surplus after dividends, &c.	197,307	266,013	29,698

The following figures relate to municipal plants, in three cities and 36 towns, of which four supply both gas and electricity, and the others electric lighting:

Municipal Plants.

Electricity.

	1915	1914	1913
Income	$1,131,948	$1,090,878	$1,052,498
Expenses	924,865	922,057	839,176
Net	207,082	168,820	213,321
Deficit after interest, depreciation, &c.	31,546	58,020	2,710

Gas.

	1915	1914	1913
Income	314,625	300,343	290,188
Expenses	250,582	233,945	212,244
Net	64,042	66,398	77,944
Surplus after depreciation, &c.	65,315	61,617	71,009

CENTENARY OF GAS LIGHTING IN AMERICA.

The middle of this month marked the hundredth anniversary of the introduction of illuminating gas into America, as was shown by an article appearing on p. 657 of our last issue. The date on which gas was first used there was June 13, 1816; and in its number dated the 12th inst., the "American Gas Light Journal"—which, being now in its 57th year, is the oldest American technical journal devoted to lighting—appropriately published the following article by Mr. H. Thurston Owens, entitled "One Hundred Years of Gas Lighting in America."

Stability and conservatism are the outstanding characteristics of the gas business, whose hundredth anniversary is being celebrated this week at Baltimore (Md.), the home of its introduction in America. Stability covers such sturdy, healthy, and virile capacities as dependability, reliability, and continuity. The gas supply of cities never fails. Gas company bonds are reputed as being safer than those of National banks. Gas-meters are looked upon as one of the most accurate of commercial measuring devices. Gas lighting burners are always ready to supply light and cheer. Meals may be cooked or houses heated at any hour of the twenty-four. Industrial operations may be performed without change of burner regulation. Gas pressures do not vary over a range that seriously affects the operation of gas appliances. Every hour of the day, every day of the month, and every month of the year, the weight and constituents of gas are of such close conformity that satisfactory service is assured.

Conservatism applies more particularly to the stationary character of the public demands and of the method of satisfying their needs. Gas companies were organized to furnish light, and to-day, after a hundred years, the bulk of the business is gas lighting. Many of the burners in use to-day resemble very closely the early devices. Gas was

first made from coal; and although the major portion is now made from oil, the large coal-gas works under construction and contemplated bid fair to turn the balance in favour of the original product—coal gas. Gas companies were the first of the utilities to demonstrate that private corporate control was better than public or municipal ownership; and the later types of suppliers of public necessities—the electric light, steam and hot-water heating, and telephone companies—have been largely aided in their early development by the conditions made ready by this pioneer industry. The vicious, as well as the warrantable, attacks on the over-valuations of utility properties always overlook the bond issues for municipal water-works that are the shame and menace to successful city government.

The regulation of public utilities was first applied to gas companies. The first of our State Commissions, organized in Massachusetts in 1885, did not concern itself with the operations of electric undertakings until 1889. The effective regulation of natural monopolies has prevented unwarranted competition, with its concomitant waste by duplication, and has been the means of securing, not only better service for the public, but also sounder business methods for the companies. The Public Service Commissions have done for gas companies what the Federal Trade Commission desires, but is powerless to do, for the manufacturer. Gas companies must keep their books so that they do not deceive either the stockholder or the public.

The dark days of gas lighting were in the early eighties, as it was then beset on one side by competition of new companies making carburetted water gas, and on the other by the infant electrical industry. Stocks tumbled, but values remained, as the demands and needs of the public were much larger than the combined capacities of all of the utilities clamouring for business.

The competition of oil-gas companies was short-lived, as in most cases the new companies, aided somewhat by local political conditions, bought out the established companies and consolidated with them. It was generally the case of the tail wagging the dog, but was the indirect cause of new blood and more aggressive methods to ward off the electric competition. Again, consolidation was the preventative of wasteful competition, as the strongly entrenched gas companies purchased their electric rivals. In only one of our large cities was the buyer the newer industry.

Within the last decade, methods of producing gas as a bye-product of the coke-oven industry have been successfully demonstrated. The gas thus made has been sold and distributed by local companies. In only one instance were the competitive methods of the water-gas companies adopted; the result being the same—the old company capitulated. If we can read the future in the history of the past hundred years at Baltimore, the following developments may be looked for in all of the large, and many of the small, situations—namely: Gas and electric companies will be combined and operated as a single concern; bye-product gas will be purchased from separate organizations; hydro-electric current purchased at the outskirts of the city transformed and sold; local stockholding to offset municipal ownership agitation; Public Service Commission regulation to prevent competition; civic activity instead of political wire pulling.

Two factors in American life may be cited on which to base our prophecy as to the future place of the gas business. Urban population is still increasing at an unprecedented rate, and by people who will pay for convenience, which means that we will cook our meals, heat our homes, and operate many large industrial appliances by means of gas, and there will be more gas sold each year for lighting during the lives of this generation. A hundred years of gas lighting has demonstrated the stability of the business and the wholesome conservatism of the American people.

TRIBUNALS AND EXEMPTION APPLICATIONS.

At a recent sitting of the Mitcham Military Tribunal, a firm of gas-mantle manufacturers applied for the exemption of five men on the ground that it was in the national interest that they should continue in their present employment. The Manager, for whom exemption was sought, had, it was stated, spent eleven years in Germany to learn the trade; and the Company were doing their utmost to take the trade away from Germany, the home of the industry. Since the outbreak of war, the output of the Company had considerably increased; and thus they were assisting materially to supply the home demand and to maintain the country's export. It was essential to retain the services of the Manager, as the Managing-Director, a Russian, who was naturalized in 1904, was in London almost every day assisting the Board of Trade on matters respecting imports from enemy countries. Quite recently he went to the docks to inspect a cargo of gas-mantles; and 90 per cent. of the cargo was rejected as being of German manufacture. The firm had 500 employees at the outbreak of the war, only 36 of whom were men of military age. Since then 22 had joined up and 6 were medically unfit. Replying to a question, the Managing-Director denied that he was of German or Austrian nationality. The Manager was given six months' exemption, the Engineer four months, the printer one month. The other two claims were disallowed.

Before the Redcar Tribunal last Thursday, Mr. T. Bateman, a Director of the Redcar Gas Company, applied for the exemption of half a dozen employees, and stated that it was hoped to shortly receive badges, through their being engaged on Government work. The Company had now reached the limit under which the work could be carried on. All the single men had joined the Army, and over one-third of the Company's employees were with the forces. Three months exemption was granted in every case. It was stated that, in consequence of the death of Mr. Mark Fligg (the Manager), further steps were to be taken towards obtaining exemption for the Cashier; the application in respect of whom was recently dismissed by the local Tribunal.

Last Wednesday the Lincoln Tribunal had an application before them by the Gas Department of the Lincoln Corporation for four em-

New Uses for Gas

LATEST DAVIS DEVELOPMENT.

The Davis Patent Organ Heater and Ventilator.
The Davis Warm-Air Drying and Ventilating Apparatus.

The above represent two very similar adaptations of the same general principle, viz., the delivery, by gas heating, of a continuous supply of warmed air (uncontaminated by combustion products) as, when, and wherever required.

The first-named Heater is expressly designed for the preservation of valuable organs; the other may be applied to almost any commercial low-temperature drying process.

Descriptive Pamphlet may be obtained from, and samples seen at:—

THE DAVIS GAS STOVE Co. Ltd.

THE GAS EXHIBITION SALONS,
60, OXFORD ST., LONDON, W.

ployees: A single labourer, aged 38, employed as blacksmiths' striker; a single labourer, aged 37, engaged in purifying work and relief stoker; a married labourer aged 38, and a married man aged 40, tinsmith, blacksmith, and meter fixer. Mr. Mainwaring stated that already twenty-one employees had been released; and there was not a man in the department at the present time under thirty years of age. The Military Representative: We think one of the single men ought to be spared. The Chairman: But they are in certified occupations. Military Representative: I agree. The Chairman: Then we have no option. Military Representative: We have asked for men who were in certified occupations to be spared, and they have been released. I suggest they spare one man. The Clerk: The position is this: At the present time he is very hard put to keep the works going with the present staff. This is a very slack time. In the autumn he will have to get more men, or there will be no gas made. Military Representative: If the applicant cannot see his way to spare one, I do not wish to press the case.

Before the Truro Tribunal last Tuesday, Mr. S. J. Ingram (the Manager of the Truro Gas Company) applied for the exemption of his son, Leslie Pool Ingram, aged 18. Mr. Ingram explained that his son, who is at present a student at Truro College, had been awarded a University Scholarship at Leeds, and was anxious to take the course in "Gas Engineering" and sit for the degree of B.Sc. As the Government had announced their intention of not sending youths on active service until they were 19, he asked that his son might be allowed to continue his studies and military training concurrently. He was at present a sergeant in the Truro College Officers' Training Corps; and he was prepared to join the University Training Corps. It was not his wish to avoid military service. The Tribunal agreed that he should be exempted until he was 19, upon continuing his military training with the Leeds University Corps.

At the Lambeth Tribunal, Mr. W. Smith, gas-meter manufacturer, of Kennington Park Road, S.E., applied for the exemption of Mr. E. W. Smith, Chairman and Managing-Director, and a large number of employees. Six months' extension was granted Mr. Smith, a foreman, seventeen sheet-metal workers, two fitters and turners, three meter testers, a diaphragm maker, and a meter-valve grinder; three months' extension, to a diaphragm maker; and one month's extension, to two meter testers, a meter cleaner, and two sheet-metal workers.

A new catalogue is available, giving current prices, of the "Victor" gas-boilers and system of hot-water supply, and the patent "Seal"-ed-oven cookers, of Mr. Thomas Potterton, of Balham. With regard to the former, the catalogue contains some serviceable suggestions for installations in the form of a series of illustrated "examples," to suit varied requirements. The first of these illustrations shows a kitchen fitted with a gas-cooker, water-heater, copper, and gas-fire. For the "Seal-ed" cooker—which, like the "Victor" boiler, is well known to "JOURNAL" readers—claims are made of low gas consumption and minimum wastage of food, in addition to other advantages.

COWLYD WATER BOARD BILL.

Terms of the Agreement.

A Bill which has been deposited by the Conway and Colwyn Bay Water Board, and which it is hoped will be shortly passed into law, is to give parliamentary sanction to an agreement entered into between the Board and the Aluminium Corporation, Limited.

The agreement provides that the Aluminium Corporation (whose works are in the Vale of Conway) shall construct an embankment or dam not less than 30 feet in height at a point below the existing dam at the Cowlyd Lake, which shall be agreed to between the Engineer to the Board and the Engineer to the Corporation. The Corporation will be entitled to increase the height of the dam at any subsequent time within the height fixed by the Act. The Corporation are at liberty to lay the foundations and proceed with the construction of the new dam immediately after the execution of the agreement. The works are to be carried out by, and at the cost of, the Corporation, in accordance with plans, &c., previously approved by the Board. When constructed, the new dam and its incidental works shall be the property of the Board, but shall at all times after the completion be maintained by the Corporation to the reasonable satisfaction of the Board. The lake will remain under the control of the Board, who will be released from the obligation under their Act of 1908 to supply compensation water to the Corporation and other riparian owners along the Afon Ddu (the former effluent from the lake). A provision assures to the Board the whole of the water represented by 1169 feet above Ordnance datum in the present lake; and the Board and Corporation are both to be entitled to draw from the lake above this level. The Corporation will be at liberty to provide for the supply of water into the lake from any other watershed, provided the Board are satisfied that the water is pure and suitable for domestic use. The Board acquire power to lay additional lines of pipes from the lake to their constituent districts; but they agree not to supply water from the lake to any new district outside the Board's area, or for the purpose of moving water-wheels or turbines or providing hydraulic power to machines exceeding 2 H.P., without the consent in writing of the Corporation.

In the preamble to the Bill, it is stated that the Board were empowered by the Act of 1908 to take from the Cowlyd Lake all the water they from time to time require for the purposes of their statutory obligations; but by section 5 of the Act they were under obligation to discharge into the Afon Ddu compensation water for the protection of the Aluminium Corporation. By reason of the urgent demand for supplies of aluminium in connection with the manufacture of munitions of war, it is expedient that the Corporation should increase their output; and for this purpose they require additional water power. The only source from which this can be obtained is the Cowlyd Lake and the Afon Ddu.

The Main Advance.

THE introduction of the ***New*** Main Cooker marks a great advance in cooker construction. A salient feature is the treble-crowned oven packed with non-conductor which reduces loss of heat to a minimum. There are many other features which will interest you. Send for particulars or, better still, a sample, which will convince you.

R. & A. MAIN, LIMITED.

WORKS: Gothic Works, EDMONTON, N.; Gothic Ironworks, FALKIRK; and Gothic Works, BIRMINGHAM.
SHOW-ROOMS AND BRANCHES: 25, Princes Street, Oxford Circus, W.; 136, Renfield Street, GLASGOW; 83, Old Market Street, BRISTOL; 18, Severn Street, Deansgate, MANCHESTER; 97, Millfield, BELFAST; 333, Queen Street, MELBOURNE; and 12, Cunningham Lane, Pitt Street, SYDNEY, N.S.W.

NOTES FROM SCOTLAND.

Dundee Gas Undertaking.—When the accounts of the Gas Department were submitted to the Law and Finance Committee of the Dundee Town Council, Treasurer Soutar, in moving their adoption, remarked that, notwithstanding all the disturbing elements encountered, the results had been most satisfactory. The increased revenue from gas sold was £32,279; while the revenue from coke, sulphate of ammonia, and tar showed an increase of £25,618. The increase in gas revenue was due to the 7d. per 1000 cubic feet put on last year, though there was an additional sale of 6 million cubic feet of gas to be noted. The gross income was £207,085, being an increase of £58,127 as compared with the previous year. On the expenditure side, the accounts revealed an increase compared with last year of £25,444 in the cost of coal alone; while the cost of making up the wages of employees with the Colours was £2774 and war bonuses £741. The net profit on the working was £16,656, which happily enabled the department to wipe off the adverse balance of £16,414 brought from the previous year, and left a balance of £242 on the right side to be carried forward. As a result of the restricted lighting of public lamps, the consumption of gas for this purpose had been fully 32½ million cubic feet less; and the community had therefore saved the sum of £3675. Difficulties had arisen in connection with the price and supply of coal; and but for the foresight and prudence of the Gas Engineer (Mr. Alexander Yuill) the public gas supply would have been seriously affected. Only the skill of their Engineer had prevented the diminishing stocks from being wholly depleted; and Mr. Yuill deserved their best thanks for his work. Briefly, the position was that, while the estimates as submitted were relieved of the adverse balance of £16,414, as incorporated in the estimates of the previous year, £7923 more was required for coal this year, and £9936 for Imperial and local taxation—a total of £17,859. The prevailing rates would, therefore, continue for another year.

Mr. R. M. Noble, in seconding the adoption of the Dundee gas accounts, said he did not believe in the history of the coal trade there had ever been such a trying time, either for the coal producer or the coal consumer. Dundee had had a prominent part in getting the Government to take action; and though there had been difficulties even since the introduction of the Coal Price Limitation Act, he hoped things would improve. In the gas undertakings there lay the making of scores of industries, if they had only the talent and the capital to prosecute them. In the past year, they had made several records. They had the largest production of gas ever made in the town, and the capital cost per million cubic feet delivered had fallen to something like £345. Referring to the tar distillation plant, he said the department had not published the accounts, though they were open to inspection by any member of the Council. They were a commercial concern; and they did not wish to give away figures to the public which would, at the same time, be of possible value to the common enemy. On being pressed, however, he stated that the total income for the year was £11,728, and the expenditure £2574, leaving a credit balance of £9134. The accounts were adopted.

Arbroath Gas-Workers' Wages.—Mr. Alex. C. Young, the Engineer and Manager of the Arbroath Corporation Gas-Works, writes (under date of June 21) in reference to the paragraph appearing in this column last week: You quote Arbroath as having granted 1s. per week war bonus to their employees. While this is correct, it is somewhat misleading. The facts are as follows: Since the declaration of war, our wages have been increased all over—ordinary labourers by ½d. per hour, and a further addition of 10 per cent. on all wages under 25s., and 5 per cent. on all wages above 25s. per week. The sum mentioned in the "JOURNAL," of 1s., is what was granted to all the employees in addition to the other increases and bonuses formerly granted.

Operation of the Summer Time Act in the Glasgow District.—A statement has been prepared by Mr. Alexander Wilson, the General Manager and Engineer of the Glasgow Corporation Gas Department, showing the effect of the Summer Time Act on the consumption of gas during three weeks within the area supplied by the department. Between 6 p.m. and 12 midnight, which is the usual period of lighting, during the same three weeks last year there were sent out 124,680,000 cubic feet of gas; while this year the quantity sent out was 104,127,000 cubic feet, a decrease of 20,553,000 feet. This means an average reduction for each evening of 979,000 cubic feet, the value of which to the consumers is fully £122. Taking the remaining eighteen hours of each day for the same period, there is an increase in consumption of 12,805,000 cubic feet, due to the great demand for gas in engineering and other establishments, principally those which are doing Government work. This makes up for more than one-half the decreased consumption during the evening.

Damages for an Acetylene Explosion.—The action in the Scottish Law Courts has been settled in which a man named Lynch sued the Acetylene Illuminating Company, of London, for £500 damages for the loss of his daughter Alice, nineteen years of age, who was in a house in Kirkintilloch when there was an explosion of a cylinder of acetylene gas. The pursuer has accepted £100 and expenses in full discharge of his claim.

In the new season's cooker list of Messrs. Fletcher, Russell, and Co., of Warrington [with a topical copyright coloured wrapper entitled "Allied Forces"], the contents have been re-arranged so that the various articles are now shown and described in series, for convenience of reference. There are numerous new introductions; while several articles have been re-introduced, as there is found to be an increasing demand for them. One of the illustrations noticed is of the "Fletcher Utility" combination gas-cooker, gas-fire, and gas-heated circulator. It is from an actual photograph, and emphasizes the advantage of the combination—that stock pattern cookers, fires, and circulators can be used without any alteration to suit the size of recesses.

Richmond's "Economic" Cooker.

Gas Engineers' Opinions:

"Once again you have made a step in the right direction."

"I have made some tests on this Cooker, and was agreeably surprised to note the results as compared with other standard makes."

"The comparison with the ordinary 'High-Grade' Cooker is so remarkable that every Undertaking should, I think, try this new pattern against the ones they are at present using."

"A step in the right direction towards the perfect article."

THE RICHMOND
GAS STOVE AND METER CO., LTD.
WARRINGTON & LONDON.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *June 26.*

While there is very little fresh to remark about the London tar products market, it is interesting to know that large quantities of tar materials for road work continue to be taken, and that the Colonies are also buyers for the same purpose. The unsatisfactorily low price of pitch is shown by a comparison of the quotations for pitch and patent fuel, both immediately before the war and at the present time, for South Wales—viz. :

End of July, 1914 . Patent fuel, 17s. to 20s. 6d. ; pitch, 38s. 6d., delivered
End of June, 1916 . ,, 50s. to 60s. od. ; ,, 28s. 3d., ,,

The above figures are taken from trade journals ; and, assuming them to be approximately correct, the result shows the tar producer now receives far less money for his pitch than he ought to obtain. Values of products generally remain unchanged.

The sulphate of ammonia position continues to strengthen ; but there are few sellers, and prices are nominal.

Tar Products in the Provinces.

June 26.

There is very little to communicate concerning the markets for tar products. No transactions of importance are reported in pitch. The freight question is still making business very difficult. Solvent naphtha is quiet ; but heavy naphtha keeps fairly steady. Creosote continues weak.

The average values of gas-works products during the past week were : Gas-works coal tar, 15s. 3d. to 19s. 3d. Pitch, East Coast, 15s. to 15s. 6d. per ton ; West Coast, 14s. to 14s. 6d. Manchester ; 15s. to 15s. 6d. Liverpool ; 17s. to 17s. 6d. Clyde. Benzol, 90 per cent., North, 10½d. to 11½d. ; 50-90 per cent., naked, North, 1s. 3d to 1s. 4d. Toluol, naked, North, 2s. 3d. Coal tar crude naphtha, in bulk, North, 6¾d. to 7d. Solvent naphtha, naked, North, 1s. 10d. to 1s. 11d. Heavy naphtha, naked, North, 1s. 2d. to 1s. 3d. Creosote, in bulk, North, 2¼d. to 2½d. Heavy oils, in bulk, 3¾d. to 4d. Carbolic acid, 60 per cent., East and West Coasts, 3s. 4d. naked. Naphthalene, salts, 80s., bags included. Anthracene, "A" quality, 2d. to 2½d. per unit ; "B" quality, nominally ¾d.

Sulphate of Ammonia in the Provinces.

LIVERPOOL, *June 24.*

During the past week there has been a good demand for this material from direct buyers, as well as from middlemen, and higher prices have again been paid in all positions. Supplies in this country are plentiful at present, but it is only the difficulties in transit that prevent shipment being made more freely. The nearest values for prompt delivery are now £16 18s. 9d. per ton f.o.b. Hull, £17 3s. 9d. f.o.b. Liverpool, and £17 5s. f.o.b. Leith. For July-September, £17s. 7s. 6d. per ton has been paid, while for October-December £17 10s. has been realized, both for delivery f.o.b. Liverpool.

Nitrate of Soda.

This market has become easier on spot, and values have declined to 18s. 1½d. per cwt. for ordinary quality, and 18s. 10½d. for refined.

Sulphate of Ammonia.

From another source it is stated that to-day's quotations for this article are as follows : Outside London makes, £16 15s. ; Hull, £16 12s. 6d. ; Liverpool, £16 15s. to £16 17s. 6d. ; Leith, £16 17s. 6d. ; Middlesbrough, £16 15s.

COAL TRADE REPORT.

Northern Coal Trade.

The quietness in the coal trade continues ; and where buyers can guarantee easy steamers they obtain concessions in the price. The demand for fuel is generally strong ; but there is a difficulty owing to the lack of adequate tonnage. This is most felt in the steam coal trade. The price is thus most affected ; while the demand for tonnage for the French ports is impeded, because producers naturally prefer the neutral ports that are not under "regulated" prices or freights. Best Northumbrian steams are irregular, at from 49s. to 56s. per ton f.o.b., according to time of delivery. Second-class steams are about 45s. per ton ; and steam smalls are steady at 30s. to 35s. per ton f.o.b. Production of coals is generally fair under present circumstances, and would be well taken up if the tonnage supply were ample. The gas coal trade is easier, the tonnage shortage affecting it also, though the demand for home needs is good for this season of the year. Best Durham gas coals are somewhere about 36s. per ton f.o b. ; second-class gas coals are near 33s. 6d. to 34s. per ton ; and "Wear Specials" are fairly steady at 38s. 6d. per ton. These prices, however, may be discounted where buyers can guarantee early vessels. There is very little doing in new contracts for gas coals. Freights are high. Gas coal, Tyne to London, is about 12s. ; while to the Mediterranean the freights are relatively higher—about 97s., Tyne to Genoa. In the coke trade, the inquiry is full for all classes. Good gas coke is quoted from 29s. to 31s. per ton f.o.b. in the Tyne. Exports of coke continue above the average, though the cost of the sea carriage is very high.

ARDEN HILL'S

"ZENITH" COMBINED GAS-HEATER AND STORAGE TANK,

With Automatic Gas Valve (Thermostat).

Made in three sizes :
10 Gallons,
20 ,,
40 ,,

Enables Gas Cooker to be regularly used in winter and summer alike.
Eliminates raw coal from domestic use.

Secures a steady gas consumption. Reduces gas-works' running expenses by increasing gas output.
Spreads capital and standing charges over wider area.

UNEQUALLED FOR PROVIDING CONSTANT SUPPLIES OF HOT WATER FOR IMMEDIATE USE AT MINIMUM COST.

On hire with many leading Gas Companies.

Illustrated List on application.

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West Bromwich Municipal Undertakings.

After remarking that the electricity undertaking has for the past year the worst record of any of the West Bromwich municipal enterprises, a writer in the local "Free Press" remarks: The Gas Committee is the only Committee in connection with our municipal trading concerns which is able to present a really satisfactory report. It is no mean achievement, in view of the circumstances which obtain, for the Committee to be able to report a net profit for the year of close upon £3000. The Engineer and the members of the Committee deserve hearty congratulations upon the result of their effort. But what some critic will probably ask is about the increase of £50 per year in the Engineer's salary. Well, for my part, I believe that both this increase and the larger increase in the salary of the Borough Treasurer were fully warranted, and that in conceding them the Council have done what is absolutely the best thing in the interest of the town. The man who can score a success under circumstances such as Mr. Johns has had to face, deserves consideration; and it is right and in the best interest of the undertaking that he should have it. With regard to Mr. Kirk, the position he holds is probably the most important under the Council; and the town owes much to the zeal and ability with which he has discharged his important duties. It is an open secret that, on his suggestion, and through his consummate ability, the Finance Committee have been able to effect changes and arrangements in connection with our financial concerns which will very much more than recoup the town for the increase in his salary. In my judgment, the decision of the Council was therefore sound policy; and Mr. Kirk is getting no more than his deserts.

Increase in Price at Stretford.—The Directors of the Stretford Gas Company announce that, owing to the continued heavy advance in the cost of materials and labour, they are compelled to increase the price of gas 5d. per 1000 cubic feet, from the date of reading the meters for the June quarter.

Stamford Lighting Contract.—Differences between the Stamford Town Council and the Gas Company, arising out of the latter's charges for street lighting for the quarter ended Dec. 25 last, have been satisfactorily settled at a meeting of the Council. The Secretary of the Company (Mr. H. Green) wrote that, while agreeing that figures prepared by the Borough Surveyor formed a fair basis for a new contract, his Directors could not admit they afforded a basis for calculating the amount of reduction in the charges proportionate to the amount of gas consumed during the quarter in dispute. They had, however, decided entirely to forego their charges for the quarter in question, amounting to £76 19s. 8d., and to accept the £288 6s. 2d. paid by the Council in settlement of the account for the year. Alderman R. Ball moved the acceptance of the offer as a fair and honourable means of settling the differences. The Company's tender for 1915 was £615; and they had made the substantial reduction of £327. The motion was adopted; and a new contract was entered into with the Company.

Gas-Works Results at Abercarn.

Mr. Thomas Wilkinson, the Engineer and Manager of the Abercarn Gas-Works, is in the fortunate position of being able to present a very satisfactory annual report, which came before last Tuesday's meeting of the Urban District Council. In spite of the increased cost of coal and wages, gas is still 3d. per 1000 cubic feet cheaper than it was three years ago, when Mr. Wilkinson took up his position there; and though these items will be higher again during the coming year, the Council have decided not to increase the charge for gas. The gross profit for the year is £2510, as against £3058, a reduction of £548. Coals have cost 18s. 11d. per ton, as compared with 14s. per ton for last year; and this on the amount carbonized equals an increase of £855 for the year, equivalent to 6½d. increase per 1000 cubic feet of gas. The extra costs total £1016. Interest and instalment of loans amount to £2066; and after paying this, there is a net profit on the year's working of £443, as against £807 last year. The revenue for the year, which includes public lighting, is £7825, as against £7587, an increase of £238. The make of residuals per ton of coal carbonized compares very favourably with previous years. The price of gas has only been increased 3d. per 1000 cubic feet, which increase came into operation on July 1. The extra charge for coal and war bonus has added nearly 7½d. per 1000 cubic feet to the cost of manufacture. Considerable trouble has been experienced in the district during the last twelve months through subsidence. Several leakages were of a serious nature, and have been the cause of increasing the leakage account over last year, which was at a reasonable figure for such a district. The make of gas has been kept well over 11,000 cubic feet per ton. The Gas Committee, in adopting the report, spoke in terms of praise of the splendid work done by Mr. Wilkinson.

Conference of Coal Owners and Miners.—At a conference held in London last week between the Parliamentary Committee of the Mining Association of Great Britain and the Executive Committee of the Miners' Federation, it was reported from the different districts of the kingdom that recommendations made at the last meeting for the appointment of Local Committees to deal with the question of absenteeism had been generally accepted, and that Committees had been formed. The Committees had not been established sufficiently long to justify any conclusion as to the results of their work; and the meeting was adjourned to a later date, when fuller reports will be received after a longer experience. The indications are so far encouraging as to lead to the belief that satisfactory results will be obtained. The recommendation that the Whitsun holidays should be curtailed had been generally accepted, with the result that the production of coal had been substantially increased. The question of suspending the Eight-Hour Act and the adoption of other measures suggested by the Home Office will not be considered further unless absenteeism is not soon found to be reduced.

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London Office: 165, Gresham House, Old Broad St., E.C.

Enemy Trading and Stock Transfers.

The Controller of the Foreign Trade Department calls the attention of all companies, municipal authorities, and bankers, who keep registers or branch or local registers, of any annuities, debenture stocks, debentures, stocks, shares, or securities, to the provisions of the Trading with the Enemy Proclamation of Sept. 9, 1914, whereby all transactions with an enemy in stocks, shares, or other securities are made illegal, and to the provisions of section 8 of the Trading with the Enemy Amendment Act of 1914, which forbids entries in such registers of any transfer of any securities therein registered, inscribed, or standing in the name of any enemy, except by leave of a court of competent jurisdiction or of the Board of Trade. These enactments are by the Trading with the Enemy Amendment Act, 1915, section 3, and the Trading with the Enemy (Extension of Powers) Act, 1915, extended to all persons who are enemies or treated as enemies under any Proclamation relating to trading with the enemy for the time being in force, and to all persons whose names appear on the Statutory List issued under the provisions of the latter Act. Moreover, by the Trading with the Enemy Act, 1916, section 10, no company shall take any cognizance of, or otherwise act upon, any notice of any transfer of any securities made to, or for the benefit of, an enemy subject, except by leave of a court of competent jurisdiction or of the Board of Trade. All companies, municipal authorities, and bankers are accordingly required, before registering or allowing any transfer of any annuities, debenture stock, debentures, stocks, shares, or other securities, to obtain declarations [in a form set out] from both transferor and transferee, or from the brokers acting for them in the transfer, or from a solicitor or banker on their behalf.

Public Lighting and Daylight Saving.—The Swansea Town Council have made arrangements with the Gas Company for the public gas-lamps to be lighted at the usual time according to the sun, and extinguished at midnight by the clock. This arrangement will apply up to Sept. 30, and will, it is estimated, effect a saving of £78.

Price of Gas at Newry.—At a meeting of the Newry Urban District Council last week, a letter was read from the Secretary of the gas-works stating that, owing to the considerable increase in the price of coal, the Gas Committee, after careful consideration, had been reluctantly compelled to increase the price of gas from 4s. 7d. to 5s. 3d. per 1000 cubic feet; and for the same reason, the Committee had instructed him to apply to the Council for an increase in the public lighting charge of 5s. per annum per single light. There were 358 single lights through the town, so that the total increase for the year would be £89 10s. The Clerk stated that in making out his estimate for the current year, he anticipated the increase, and provided for a sum of £800 for the current year's lighting. The Council decided to accede to the application of the Committee, on the condition that in the coming autumn the number of lighted lamps shall be reduced so as to provide that the amount paid by the Council for public lighting in the year will not exceed that provided for in the estimate.

Looking Back and Looking Forward.

In an article published in the "Evening News," on "Making the Most of our Coal Supply," the author—who signs himself "W. G. F."—taking as a test the statement of Sir William Garforth, when presiding at the recent meeting of the Institute of Mining Engineers, that coal should no longer be regarded as fuel, says: Looking back upon the five or six years which preceded the war, we have need to be thankful that this country resisted the German attempt, many times made by German scientists, who came over here, to persuade us that the only power and light worth talking about was electric. If we had scrapped our gas-works or had deserted gas for electricity, as they would have had us do, apparently then to enrich their producers of electric appliances, we might have been in a parlous position now in the matter of the manufacture of explosives; and all hope of recovering the dye industry would have been lost. Only the Germans have known the colossal value of the wealth obtainable from what are called residuals in gas-works. If this country has the coal, Germany has the chemists. We want the chemists—the pioneers of modern industry. The chemists alone can convert these gas residuals into products which will revolutionize our industry and add tremendously to its power in fighting German industry in the years to come. The public may live yet to learn that tar, which was once thrown away or burned—which was really of little commercial value until the coming of the motor-car, which necessitated the provision of a dust-laying and road-preserving material—is richer than gold deposits. Discoveries of its increasing value for many purposes are bound to result in an increasing demand for its output. The Government do many things now in the name of the State. They may one day—realizing that in the manufacture of gas there lies the genesis of unparalleled industrial prosperity—startle us with an announcement that coal is no longer to be regarded as a fuel; that the fuel burnt in our grates must contain only a proportion of coal, the remainder being coke, because in the production of coke we are providing ourselves with a mighty weapon in the struggle for the world's markets. If they do, who will grumble?

Increase in Price at Reading.—The Reading Gas Company will advance the price of gas from the Midsummer meter reading—by ordinary meters within the borough to 2s. 8d. per 1000 cubic feet, with corresponding advances to prepayment consumers, and also to consumers by ordinary meters outside the borough.

German Coal Supplies.—There is a decided disposition among the large German industrial undertakings, says the "Manchester Guardian," to render themselves independent of the Coal Syndicate by, either individually or collectively, acquiring their own mines. A number of engineering firms have recently purchased mines; and others are known to be negotiating with this end in view. The movement is also spreading to the municipalities. Berlin, for example, is about to purchase extensive mines so that she will be able to supply her own requirements for gas making.

Heat-Resisting Glassware

of BRITISH MANUFACTURE.

¶ The Charnley Manufacturing Co., Ltd., are prepared to supply from stock many standard sizes of Heat-Resisting Glass Globes equal in every respect to the finest foreign manufactures.

¶ Buyers interested will be well advised to order samples without delay.

The CHARNLEY MANUFACTURING CO., LTD., GLASS DEPARTMENT,
WHITEFIELD, MANCHESTER.

A Cardiff Arbitration Award.

Some time ago, a lengthy arbitration of a friendly character took place, before Mr. Edward Sandeman as Arbitrator, respecting a claim by Mr. L. P. Nott, of Bristol, against the Cardiff Corporation. Mr. Nott was the Contractor for the new Llwynon reservoir; and he maintained that, under twenty different heads, he was entitled to be paid a sum of £34,939 beyond the contract price. The claim was principally in respect of alleged insistence by the Corporation Water Committee on the use of material and workmanship in excess of the quality specified in the contract. Mr. Sandeman has now made his award, which is to the effect that the Corporation are to pay £12,361, and the whole of the costs. The award is, however, in the form of a special case on various points of law which arose, and is subject to the decision of the Court on these points. A Sub-Committee of the Water Committee have decided to obtain the opinion of Counsel as to the effect of the award and the steps to be taken in relation thereto.

Suggested "Economies" at Southend.

The Committee appointed by the Southend-on-Sea Town Council to consider the question of economies in expenditure, report having had under consideration, from the point of view of their reference, the system now in force in connection with their Leigh gas undertaking, whereby the Corporation supply pipes and fittings to consumers of gas in houses of a rateable value not exceeding £20 a year, subject to their paying 4s. 2d. per 1000 cubic feet for gas consumed, instead of the ordinary rate of 3s. 4d. From information laid before them, the Committee are not convinced that the system results in a profit to the undertaking, and have, therefore, recommended that the free installation system should be considered by the Gas Committee. The Borough Surveyor has received instructions not to light, during the summer months, any of the street lamps in the borough, except certain ones on the outskirts of the town used for the purpose of illuminating transparent notices. With the view of lessening future outgoings from the Corporation funds in connection with street lighting, the Economies Committee recommend that the Highways Committee should be asked to consider the question of substituting electricity for gas in the streets at present lighted by the latter illuminant, and for this purpose of terminating the agreement with the Southend Gas Company in March, 1917. A special meeting of the Council is to be held to consider the report.

Haverhill Gas-Works Results.—The Gas Committee reported at the monthly meeting of the Haverhill Urban District Council that the working statement for the past financial year showed that 20,935,500 cubic feet of gas had been made. Of this quantity, 17,036,500 cubic feet had been sold by meter, and there was 3,144,000 feet unaccounted for. The make of gas per ton of coal was 11,400 cubic feet.

Colwyn Bay Gas Report.

In his report for the year ended March 31, which came before the Colwyn Bay Urban District Council last Tuesday, Mr. J. Smith (the Gas Manager) stated that the gas produced during the twelve months showed an increase of 4,514,000 cubic feet. Coal cost 4s. 3·542d. per ton more. The results were again good, especially considering the large percentage of slack used, the inferior value of coal supplied during part of the winter, and the effect of toluol extraction. The labour cost remained at 1·59d. per 1000 cubic feet of gas sold, which ranked among the lowest for municipally-owned works in the kingdom. With an increase in the output, these costs would decrease, enabling a higher efficiency to be obtained from the plant. The Committee had been able to maintain the reduced charges for gas fixed in July, 1914, while the majority of undertakings had had to increase their prices to a much higher figure than those prevailing immediately preceding the war. The increased cost of coal and the cash value of the reduced charges on last year's sales of gas represented a total value of £4055, which had to be met during the year to avoid the necessity of increasing the price. This had been accomplished; and a surplus of £1183 was also available for allocation as the Committee might decide.

The "Wandle" Captain Honoured.

A function of unique interest took place at Stanley's Masonic Hall, last Tuesday evening, when the Wandle Lodge of Freemasons, No. 2699, conferred on Bro. Captain Mastin, of the "Wandle" (owned by the Wandsworth, Wimbledon, and Epsom District Gas Company), the honorary membership of the Lodge, in appreciation of his successful encounter with a German submarine in the North Sea during April. The banquet which followed the Lodge proceedings was presided over by Bro. John Venner (W.M.), who was supported by the Mayor of Wandsworth (Bro. A. D. Dawnay), Bros. Welch (ex-Mayor of Chelsea), H. G. Hills (ex-Town Clerk of Wandsworth), C. W. Braine (Secretary of the Wandsworth Gas Company), H. O. Carr (the Chief Engineer), and others. Bro. Barrow, in proposing the toast of "Our Honorary Member, Bro. Captain Mastin," said he could not express the pleasure they felt in offering him the little compliment of honorary membership of the Lodge. The Worshipful Master then asked Captain Mastin to accept an inscribed vellum, in honour of the heroic deed he performed in the North Sea. The speeches included some interesting remarks by Bro. Braine and Bro. Carr on the "Wandle's" exploit.

Primitiva Gas Company of Buenos Ayres.—The Board of this Company announce that it has been impossible to obtain any payment from the Municipality of Buenos Ayres on account of the large amount due for the public lighting service [see "JOURNAL" for April 25, p. 185]; and that in these circumstances the preference dividend due on July 1 cannot be paid.

"CANNON" Gas Cookers

The "County"

Still maintains its POPULARITY, OWING TO ITS MANY ADVANTAGES.

Up-to-Date in Construction.

It is to your interest to have this COOKER ON YOUR HIRE LIST.

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Coventry Water Supply.—The total receipts of the Coventry water undertaking for the past financial year amounted to £37,493, as compared with £35,555 for the preceding twelve months. From a disposable balance of £6136, the Committee recommend that £5000 be handed over in relief of the rates, and that £1000 be set aside to meet capital expenditure for which loans cannot be obtained.

Increased Price at Plymouth and Totnes.—The Plymouth and Stonehouse Gas Company announce that the price of gas will be advanced by 8d. per 1000 cubic feet from the date of reading the meters for the Midsummer quarter. This will make the price 2s. 8d. per 1000 cubic feet, an increase of 11d. since the war began. The Totnes Gas Company have given notice that the price of gas in the town will be increased to 5s. per 1000 cubic feet as from Midsummer.

East Surrey Water Company.—The report for the year ended March 25, which was submitted at the annual meeting of the Company last Friday, stated that there was a profit of £25,287, which, with the balance of £10,023 brought forward from the previous year, made a sum of £35,310. After paying interest on the debenture and preference stock, and placing £1000 to the renewal and contingency fund, the Directors recommended dividends of 5 per cent. on the preference shares, 7 per cent. on the ordinary "B" shares, and 10 per cent. on the original ordinary "A" shares—all less income-tax. The balance carried forward will be £10,758.

The Directors of the Continental Union Gas Company announce that they are unable to declare the usual interim dividends on the preference and ordinary stocks, which, under normal trading conditions, would be payable on July 14.

His Honour Judge Thomas, sitting in the Southport County Court, last Tuesday had before him a claim for £35, alleged to be due as damages for breach of contract. The plaintiffs were George Ball, Limited, druggists, of Southport, and the defendant was John White, manufacturers' agent, of Liverpool. The plaintiff's case was that in July last the defendant, in consideration of the payment of £54 to him by the plaintiffs, entered into a contract to supply them with 1000 gallons of benzol at 1s. 1d. per gallon, to be taken as required. Presumably the defendant could not fulfil the contract owing to the Government commandeering benzol. He supplied turpentine to the value of £19. In January last, he wrote that he did not want any further trouble, and asked plaintiffs to accept £10 then, with another £10 the following week, and the balance in February. It was the difference between the contract price of the benzol and the value of the turpentine supplied which was now claimed. A partner in the plaintiff firm said if he had bought against the contract in the open market he would have had to pay double the contract price for the benzol; and in that event he could have claimed more than double the amount he was now asking for. An order was made for the amount claimed.

STOCK MARKET REPORT.

LAST week the Stock Exchange markets underwent a phase of reaction from the extreme buoyancy, not to say inflation, which they had been enjoying for the past few weeks. This is by no means a matter for regret, for to them—as to other institutions—an occasional reminder of mundane instability is wholesome. Operating causes of the check might be found in the falling off of the inrush of money from realized Dollar Securities, and the launching of sundry Colonial loans. The gilt-edged market was thus affected, and War Loan and Consols receded; but they made some partial recovery before the close. Home Rails took much the same line. The Foreign Market, however, was exceptionally strong. French, Russian, Japanese, Chinese, and Brazilian issues were again conspicuous. Americans naturally were depressed; the week culminating in the outbreak of actual hostilities in Mexico. Argentines were quite dull, and South Africans slack. The Miscellaneous Market did not present as many bright points as of late. Oils were firm, and some industrials pretty good; but rubber was dull, and shipping concerns generally weaker. Business in the Gas Market showed a considerable increase in point of activity, and operations embraced several issues which make but infrequent appearances in the bargains' column. The general tone was quite firm—every undertaking maintaining or slightly improving its recent figures. The Directors of the Primitiva Company announce that, owing to their inability to collect the rental for public lighting, they have no option but to pass the dividend on the preference and ordinary shares. The Treasury have at last declared that the highly popular five-year War Savings Certificates are to be exempt from income-tax. But whether the War Expenditure Certificates will be similarly treated remains unknown. The Stock Exchange is growing impatient that the remaining minimum prices should at last be abolished.

Bargains done for cash during the week were as follows: Gas Light maximum 61, Primitiva 39s., 39s. 6d., ditto preference 64s., 65s., 65s. 6d., South Metropolitan 80½, ditto debenture 60½. On Tuesday, British 35, 35⅛, European 13⅜, Gas Light ordinary 76½, 77, 77½, 77¾, 78, ditto maximum 61½, ditto 10 per cent. bonds 192, 192½, Imperial Continental 76, 76¼, 77¼, Primitiva preference 66s., South Metropolitan 80⅜, 81½. On Wednesday, Commercial 4 per cent. 73½, 74, ditto 3½ per cent. 70, 70½, ditto debenture 54, Continental Union 35, Gas Light ordinary 77½, 77¾, 78, Malta 4⅜, South Metropolitan 80½, 81½, 81¼, 82, South Suburban debenture 91⅛, Wandsworth "B" 97, 97½. On Thursday, Alliance and Dublin, 64, Cape Town 28s., 28s. 6d., Gas Light ordinary 77, 77⅜, ditto debenture 60, 60½, Imperial Continental 77, 77¼, Primitiva preference 63s. 9d., 65s. 7½d., South Metropolitan 81½, 82, ditto debenture 60, 60½. On Friday, Alliance and Dublin 65⅜, Cape Town 27s., Commercial 4 per cent. 73½, ditto 3½ per cent. 70, European 13⅜, Gas Light ordinary 77½, 77½, 78, Imperial Continental 77, 77½, 77½, ditto debenture 64, Primitiva 36s. 3d., South Metropolitan 81½, 82, South Suburban debenture 92. On Saturday, Bombay 5⅜, 5⅜, Gas Light ordinary 77¼, 77½, 77⅜, 78, 78¼, ditto debenture 59⅜, 60⅛, Oriental 103, South Metropolitan 81, 81½, 82.

The Bank rate is 5 per cent.—as fixed on Aug. 8, 1914.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue.	Share.	When ex-Dividend.	Previous Div or Dividend & Bonus.	Last Dividend.	NAME.	Closing Prices, July 30, 1914.	Yield on Highest Closing Price.	Lowest and Highest Prices of Bargains.
£			p.c				£ s. d.	
1,551,868	cons.	April 8	2½	5⅛	Alliance & Dublin Ord.	59—64	3 18 2	64—64⅜
874,000		July 10	4	4	Do. 4 p.c. Deb.	76—79	5 1 3	..
980,000	5	April 29	7½	8/-	Bombay, Ltd. . . .	5½—6⅜	5 17 8	5⅜—5⅜
50,000	10	Feb. 26	16	15/-	Bourne-mouth Gas and Water { 10 p.c.	29—30	5 6 8	..
333,110	10	,,	7	7/-	B 7 p.c.	15—15½	4 10 4	..
115,000	10	,,	6	6/-	Pref. 6 p.c.	13½—14	4 5 9	..
151,740	—	—	—	4	4 p.c. Deb.	..	—	..
932,045	Stk.	Feb. 26	†14	£6/-	Brentford A Consold. .	261—266	5 5 3	..
734,940	,,	,,	†11	55/-	Do. B New . .	204—209	5 5 3	..
55,000	,,	,,	5	5	Do. 5 p.c. Pref. .	109—111	4 10 1	..
221,400	,,	June 11	4	4	Do. 4 p.c. Deb. .	91—93	4 6 0	..
217,380	Stk.	Feb. 26	11	10⅜	Brighton & Hove Orig.	208—213	5 5 4	..
244,200	,,	,,	8	7½	Do. A Ord. Stk. .	154—159	5 0 8	..
630,000	20	Mar. 26	12½	22/6	British	44—45	5 11 1	35—35⅛
120,000	Stk.	June 26	4	4	Do. 4 p.c. Deb. Stk.	88—90	4 8 11	..
245,771	Stk.	June 26	4	4	Buenos Ayres 4 p.c. Deb.	85—87	4 13 0	..
100,000	10	—	—	—	Cape Town & Dis., Ltd.	1½—2½	—	27/—28/6
100,000	10	—	—	4/6	Do. 4½ p.c. Pref. .	4—6	—	..
100,000	Stk.	June 26	4½	4½	Do. 4½ p.c. Deb. Stk.	70—75	6 0 0	..
157,150	Stk.	Feb. 26	5	5	Chester 5 p.c. Ord. . .	108—110	4 10 11	..
1,513,280	Stk.	Feb. 12	5,9/4	49/4	Commercial 4 p.c. Stk.	106—108	5 1 2	73½—74
560,000	,,	,,	5¼	46/8	Do. 3½ p.c. do. .	103—105	5 1 6	70—70½
475,000	,,	June 11	8	8	Do. 3 p.c. Deb. Stk.	69½—71½	4 8 11	54
800 000	Stk.	,,	4	—	Continental Union, Ltd.	76—79	5 1 3	35
200 000	,,	,,	7	—	Do. 7 p.c. Pref.	115—118	5 18 8	..
278,400	—	—	—	11½	Croydon B and C 7 p.c.	..	—	..
492,270	Stk.	—	6	5½	Derby Con. Stk. . . .	128—135	4 16 0	..
55,000	,,	—	4	4	Do. Deb. Stk. .	102—104	3 16 11	..
1,009,180	10	July 29	10	10/-	European, Ltd. . . .	17½—18	5 11 1	18⅜
16,827,185	Stk.	Feb. 10	4/17/4	42/-	Gas Light and Coke { 4 p.c. Ord. .	98—102	4 15 6	76½—78½
2,600,000	,,	,,	3½	3½	3½ p.c. max. .	76—79	4 8 7	61—61½
4,062,235	,,	,,	4	4	4 p.c. Con. Pref.	96—99	4 0 10	..
4,674,850	,,	June 11	3	3	3 p.c. Con. Deb.	72½—74½	4 0 6	59⅜—60½
130,000	,,	,,	10	10	10 p.c. Bonds .	..	— .	192—192½
258,740	Stk.	Mar. 12	5	4½	Hastings & St. L. 3½ p.c.	87—89	5 12 4	..
70,000	10	April 29	11	6	Hongkong & China, Ltd.	16½—16¾	6 11 4	..
86,600	—	—	—	9½	Hornsey 7 p.c. . . .	..	—	..
181,000	Stk.	Mar. 12	7½	7½	Ilford A and C . . .	151—154	5 2 4	..
65,780	,,	,,	6¾	5⅝	Do. B	115—118	5 8 0	..
65,500	,,	June 26	4	4	Do. 4 p.c. Deb. .	92—94	4 5 1	..
4,940,000	Stk.	May 14	9	4½	Imperial Continental .	150—160	5 12 6	76—77½
1,335,000	Stk.	Feb. 12	3½	3½	Do. 3½ p.c. Deb. Red.	84—86	4 1 5	64
235,942	Stk.	Mar. 12	6½	6½	Lea Bridge Ord. 5 p.c. .	119—121	5 7 5	..
2,498,905	Stk.	Feb. 26	10	5	Liverpool 5 p.c. Ord. { A	211—213	4 13 11	..
					{ B	146—148	4 14 7	..
806,083	,,	June 26	4	4	Do. 4 p.c. Pr. Deb. Stk.	..	—	..
75,000	5	June 11	6	2/-	Malta & Mediterranean	4½—4⅝	6 9 9	4⅜
250,000	100	April 1	4½	4½	Met. of Melbourne { 4½ p.c. Deb.	99—101	4 9 1	..
541,920	20	May 28	4	6/-	Monte Video, Ltd. . .	11½—12	6 18 4	..
1,875,892	Stk.	July 29	4½	4½	Newc'tle&G'tesh'd Con.	98½—99½	4 10 6	..
582,705	Stk.	June 26	8½	8½	Do. 3½ p.c. Deb.	82—83	4 4 10	..
55,940	10	Feb. 26	7/14/0	7/8/8	North Middlesex 7 p.c.	14—16	5 2 8	..
360,000	Stk.	May 14	8	8	Oriental, Ltd. . . .	117—122	6 11 2	103
60,000	5	Mar. 26	10	1/-	Ottoman, Ltd. . . .	7¾—7⅞	6 9 0	..
60,000	50	Feb. 26	12	65/-	Portsea, Island B . .	128—131	4 19 8	..
100,000	50	,,	12	60/-	Do. C . .	118—121	4 19 2	..
52,000	50	,,	10	—	Do. D . .	..	—	..
249,980	5	April 29	8	—	Primitiva Ord. . . .	5½—6	6 18 4	36/3
499,960	5	June 26	5	2/6	,, 5 p.c. Pref. .	4½—5	5 0 0	63/9—66
521,600	100	June 2	4	4	,, 4 p.c. Deb. .	91—93	4 6 0	..
—	—	—	—	4	,, ,, ,, 1911	..	—	..
346,198	Stk.	June 26	4	4	River Plate 4 p.c. Deb.	85—87	4 12 0	..
150,000	10	May 14	6	6/-	San Paulo { 6 p.c. Pref.	10⅜—11	5 9 1	..
135,000	50	July 1	5	5	5 p.c. Deb.	47—49	5 2 0	..
135,000	Stk.	Mar. 12	10	10	Sheffield A	223—224	4 9 8	..
209,984	,,	,,	10	10	Do. B	223—224	4 9 8	..
528,500	,,	,,	10	10	Do. C	220—222	4 10 1	..
90,000	10	May 28	9	6/-	South African . . .	10⅜—11⅛	7 16 6	..
6,609,895	Stk.	Feb. 10	5/4/0	44/-	South Met., 4 p.c. Ord.	111—113	4 16 8	80½—83
1,895,445	,,	July 10	3	3	Do. 3 p.c. Deb.	72¾—74½	4 0 6	60—60½
224,830	Stk.	Feb. 26	8½	8	South Shields Con. Stk.	157—159	5 6 11	..
952,795	Stk.	Feb. 26	6	48/4	S'th Suburb'n Ord. 5 p.c.	114—116	5 3 5	..
60,000	,,	,,	5	5	Do. 5 p.c. Pref. .	110—112	4 9 3	..
135,000	,,	,,	—	48/4	Do. West Kent. . .	..	—	..
187 558	,,	June 26	5	5	Do. 5 p.c. Deb. Stk.	116—118	4 4 9	91½—92
647,740	Stk.	May 14	5	5	Southampton Ord. . .	99—102	4 18 0	..
120,000	Stk.	Feb. 12	7½	7½	Tottenham { A 5 p.c. .	185—188	5 8 8	..
782,275	,,	,,	6	6	District { B 3½ p.c.	116—117	5 2 7	..
181,255	,,	June 26	4	4	4 p.c. Deb.	87—89	4 9 11	..
189,880	10	Dec. 30	5	—	Tuscan, Ltd.	5—6	8 6 8	..
149,900	10	July 1	5	5	Do. 5 p.c. Deb. Red.	93—95	5 5 3	..
236,476	Stk.	Mar. 12	5	5	Tynemouth, 5 p.c. max.	108½—109½	4 11 4	..
					Wandsworth, Wimbledon, and Epsom—			
80,000	Stk.	Feb. 26	5⅜	78/9	Wandsworth A 5 p.c.	151—156	5 7 4	..
255,636	,,	,,	6¾	63/9	,, B 3½ p.c.	129—134	5 2 7	97—97½
108,075	,,	,,	5/17/8	55/1½	,, C 3½ p.c.	110—115	5 2 0	..
352,000	,,	,,	6¼	67/6	Wimbledon 5 p.c. .	117—122	5 0 5	..
98,000	,,	,,	6⅜	63/9	Epsom 5 p.c. . . .	121—126	5 5 2	..
88,416	,,	June 26	3	3	3 p.c. Deb. Stk. . .	66—69	4 6 11	..

† Paid on Old 10 p.c. and 7 p.c. Standard Stocks.

Plymouth and Stonehouse Gas Company.—The Directors of the Company, in their report for the year ended March 31, state that they regard the statement of accounts as very satisfactory, taking into consideration the high prices of coal and oil and the difficulty of obtaining necessary supplies. It is felt that the scarcity of steamers suitable as coasting colliers is sure to cause increasing anxiety and higher freight rates until the war is ended, unless the Government control the freight markets. They regret that, in view of still higher charges to be paid for coals, oil, and more particularly transport, during the next twelve months, the price of gas must be considerably advanced to meet these additional burdens. There has been a very satisfactory increase in the sale of gas, though the military regulations curtailed artificial lighting in many directions. From the credit balance of £44,829, the Directors recommend a dividend for the half year ended March 31 of 5¾ per cent. per annum on the ordinary stock, 9s. per share on the "additional" shares, and 8s. 6d. per share on the "New Shares Act, 1879," less tax. This will absorb £9833, leaving £34 995 to be carried forward. The Directors report that the Bill for acquiring Harvey's tar-works and for other purposes has been read a second time in the House of Lords.

Messrs. A. & W. Richards are, as will be seen from an announcement in our advertisement pages, asking for tenders for 600 £10 "B" shares which are being issued by them on the instructions of the Directors of the Grays and Tilbury Gas Company. The shares rank for a standard dividend of 7 per cent. equally with the Company's existing similar shares, now receiving £5 19s. per cent. The minimum price of issue is £10 per share.

The meeting of the James Keith and Blackman Company, Limited, was presided over by Mr. T. W. Alsop (the Chairman), who said the business done in the period under review constituted a record. It was 18 per cent. more than in 1915; and this increase had been secured notwithstanding a decrease in the lighting, which was an important part of their business. He had no doubt the lighting trade would be recovered, with the return of normal times. Patents and goodwill were entirely wiped-out of the balance-sheet; and the Directors were getting near the goal at which they were aiming—a reserve of £100,000. The carry-forward was £12,055. In this they had provided for the excess profits tax. Mr. James Keith (the Managing-Director) remarked that they began the current year well; and there was every reason to hope that the business would go on prospering. Up to date, no less than 225 of their men (or about 25 per cent. of the employees) had joined the Colours; and nine of them had unhappily been killed.

Wolverhampton is still faced with a shortage of water. The removal of the 12 tons of 17-inch diameter pipe which fell down the bore hole several months ago (as reported in our pages at the time) is proving a difficult task. The hope is expressed that the inhabitants of the town will be very careful in the use of the water during the summer months.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for June 21.]

Nos. 8257—8593.

Battey, S. A.—"Liquid meters." No. 8388.
Foster, A. S.—"Gas-washers." No. 8381.
Gidden, W. T.—"Purification of gases." No. 8301.
Hill, H.—"Woven tubular fabrics for mantle foundations." No. 8262.
Holmes, W. C., and Co.—See Foster. No. 8381.
Ionides, A. C.—"Gas-heated furnaces." No. 8461.
Keith, G. & J.—"Lamp-globes." No. 8441.
Moore, J. C.—See Battey. No. 8388.
Sanders.—R. W.—Portable electric lighters for gas." No. 8285.
Svenska Aktiebolaget Gasaccumulator.—"Incandescent lighting means." No. 8352.
Tylor, J., and Sons.—See Battey. No. 8388.

NEWSPAPERS FOR NEUTRAL COUNTRIES.

The Secretary of the War Office has issued the following order:

> The public are informed that newspapers and other printed publications will not be sent to Neutral European Countries unless posted direct from the office of publishers or newsagents who have obtained permission from the War Office for this purpose. Persons desiring to send newspapers, &c., to Neutral European Countries should, therefore, give their orders for execution to publishers or newsagents who have obtained such permission.

The Publisher of the "Journal" has obtained the required permission of the War Office; and he will, on receipt of instructions, forward copies direct from the office to any neutral country.

WANTED, FOR SALE, CONTRACTS, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

Appointments, &c., Vacant.

Engineer, Manager, and Secretary. Redcar, &c., Gas Company. Applications by July 4.
Collector. No. 6191.
General Clerk. Bridlington Gas Company.

Sale of Shares.

Grays and Tilbury Gas Company. Tenders to A. & W. Richards by July 6.

Meetings.

Malta and Mediterranean Gas Company. 59 and 60, Gracechurch Street, E.C. July 11. 11.30 o'clock. Also on Aug. 1, same time and place.

TENDERS FOR

Coal.

Haverhill Urban District Council. Tenders by July 11.

Governor (Station).

Tipton Gas Department. Tenders by July 8.

Pipes and Fittings.

Todmorden Gas Department.

Tar.

Altrincham Gas Company. Tenders by July 18.

NOTICES TO CORRESPONDENTS, ADVERTISERS, AND SUBSCRIBERS.

No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer—not necessarily for publication, but as a proof of good faith.

COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office NOT LATER than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders to Alter or stop PERMANENT ADVERTISEMENTS should be received by the FIRST POST on Saturday.

Wanted, For Sale, and Tender Advertisements, Six Lines and under 3s.; each additional Line, 6d.

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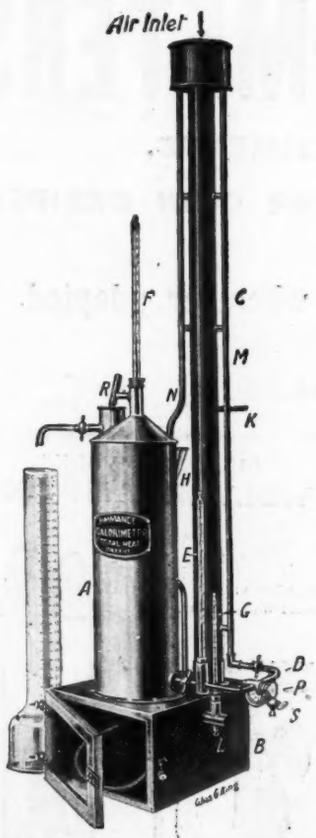

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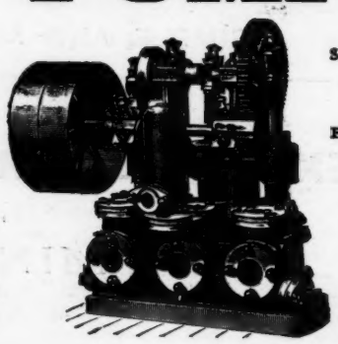

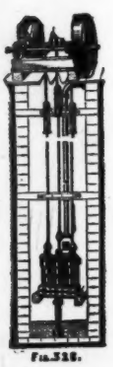

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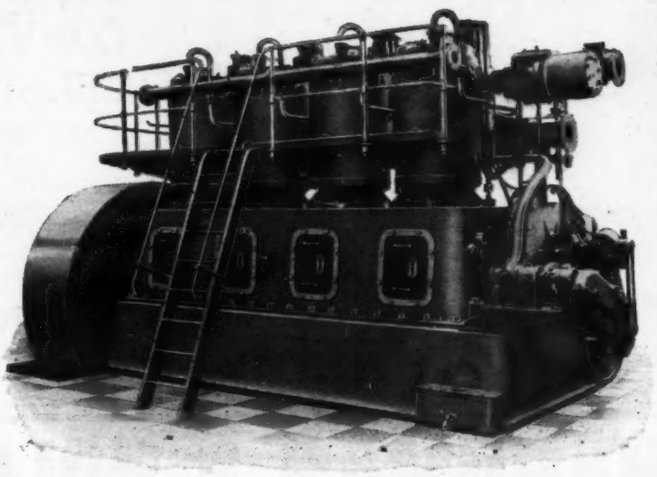

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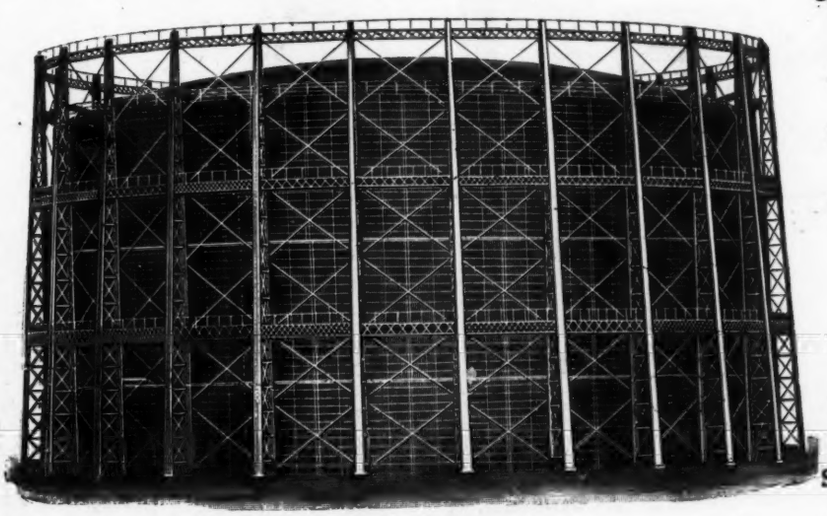

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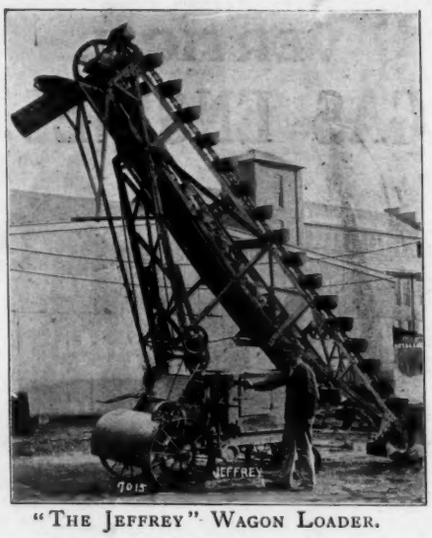

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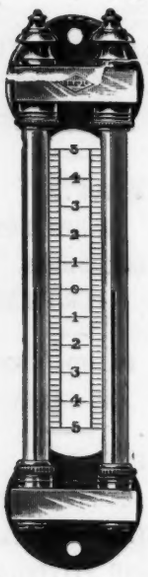

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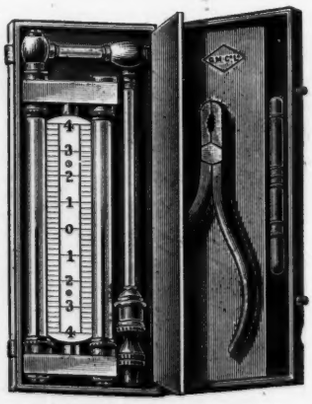

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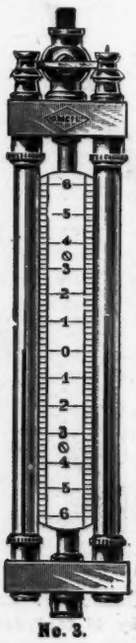

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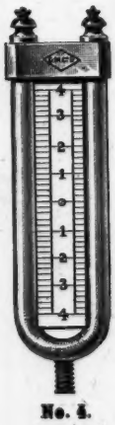

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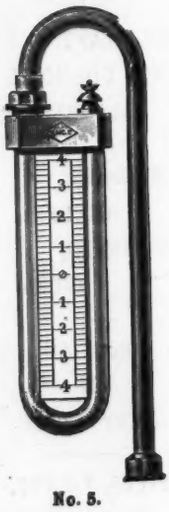

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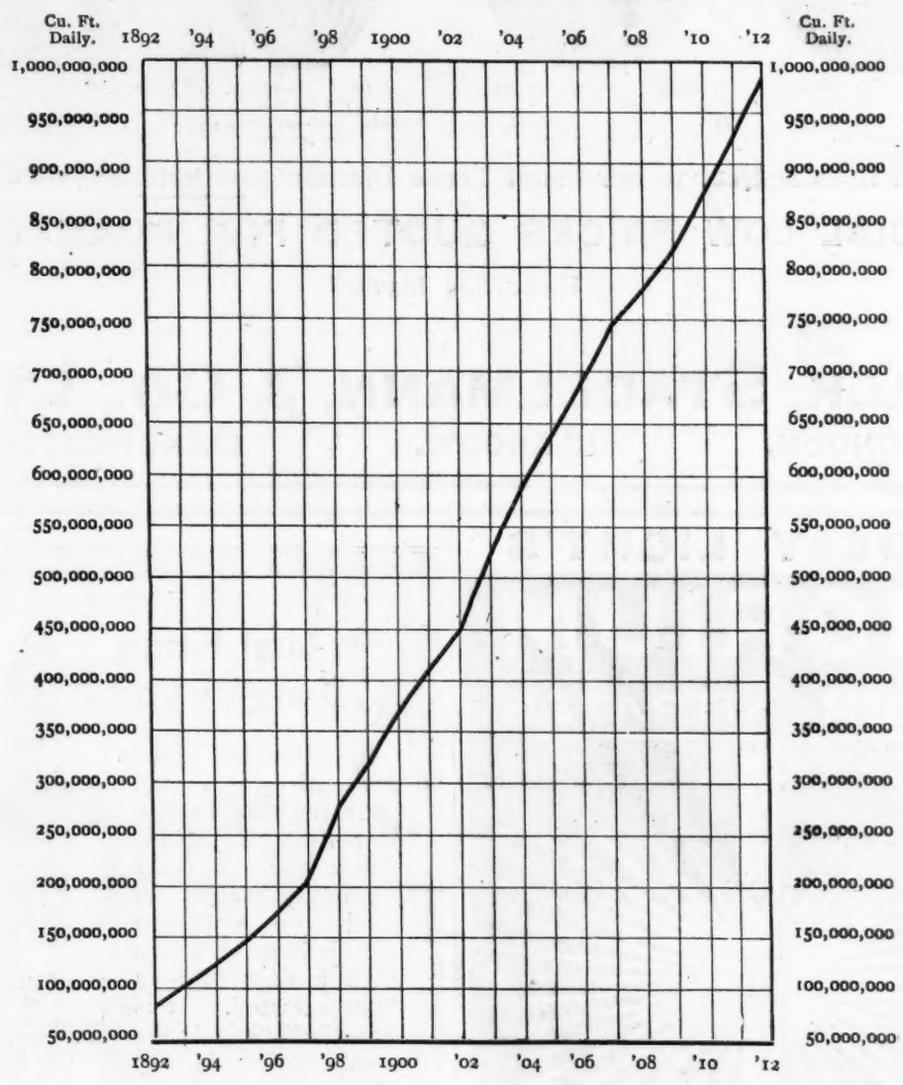

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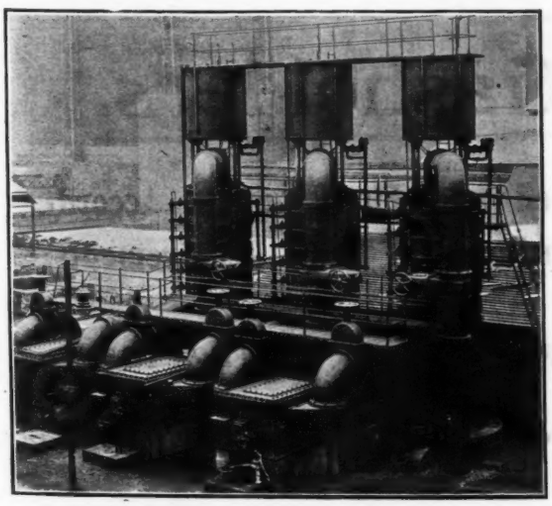
For Extraction of Ammonia, Toluol, Cyanide, Benzol, Naphthalene, &c., from Coal and Other Gases.



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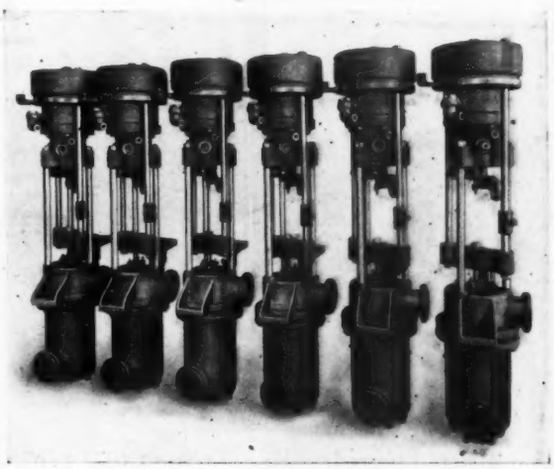

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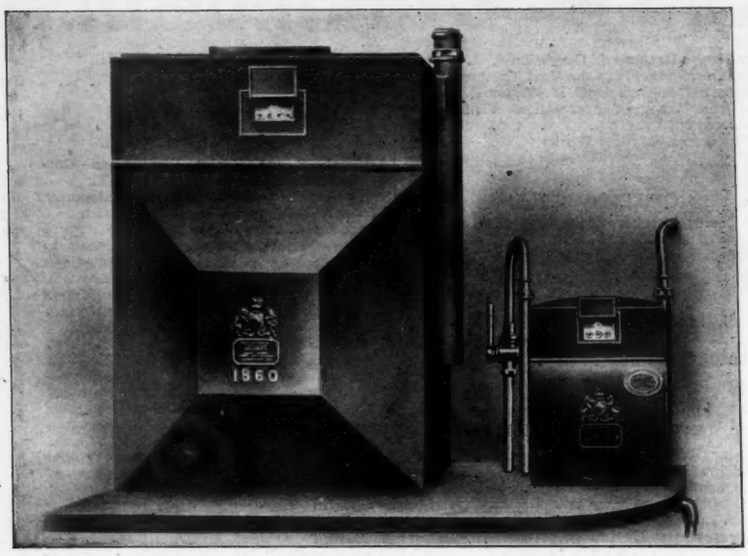

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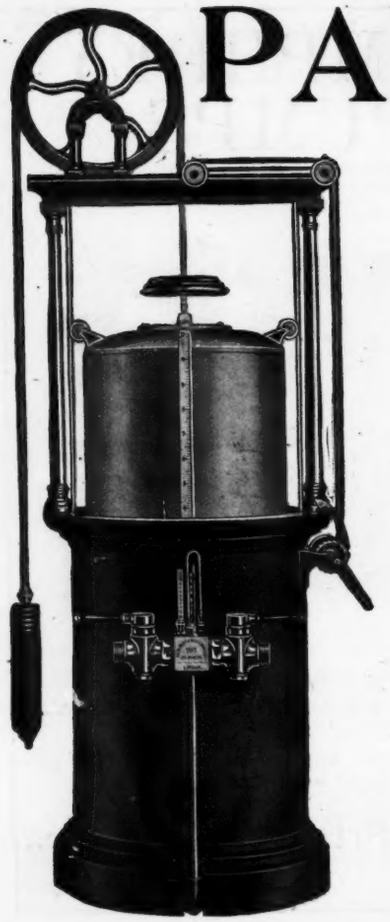

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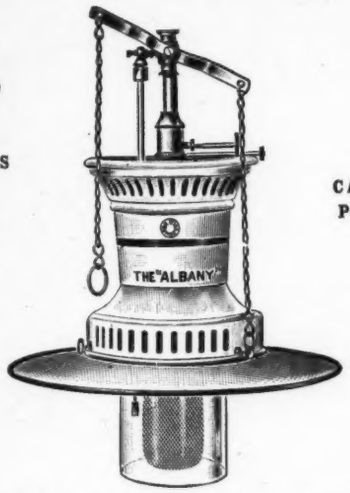

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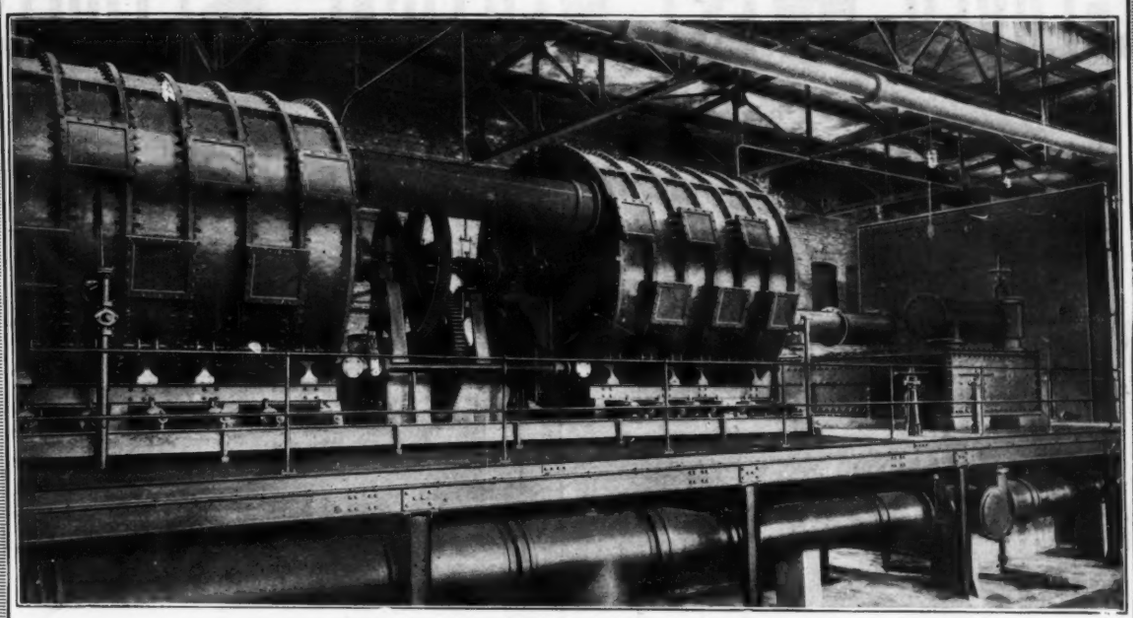

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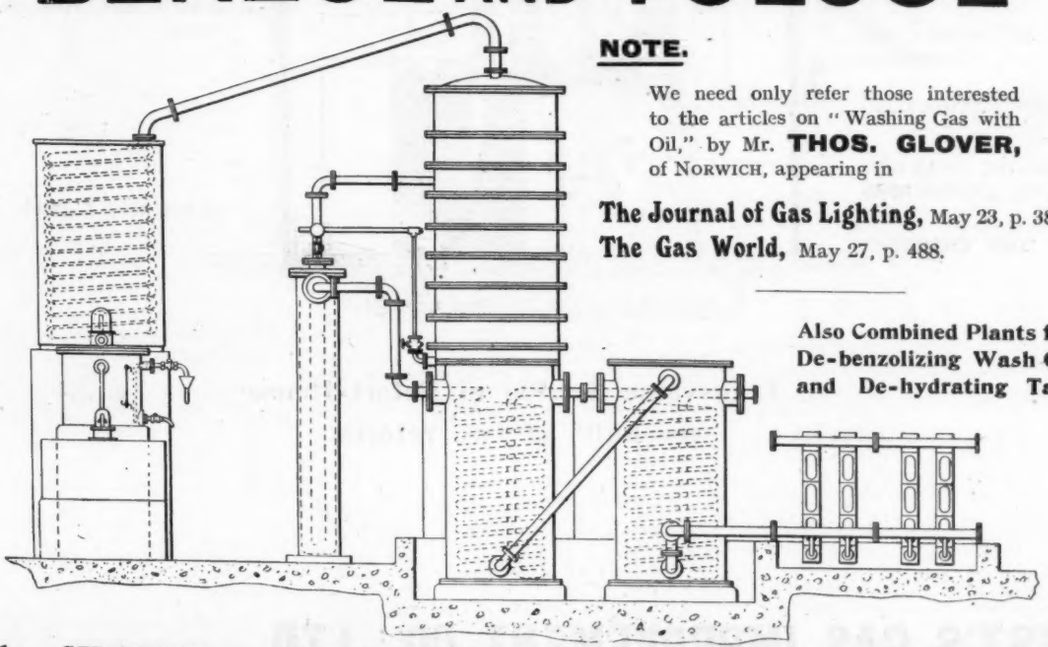

NOTE.

We need only refer those interested to the articles on "Washing Gas with Oil," by Mr. **THOS. GLOVER,** of NORWICH, appearing in

The Journal of Gas Lighting, May 23, p. 387.
The Gas World, May 27, p. 488.

Also Combined Plants for De-benzolizing Wash Oil and De-hydrating Tar.

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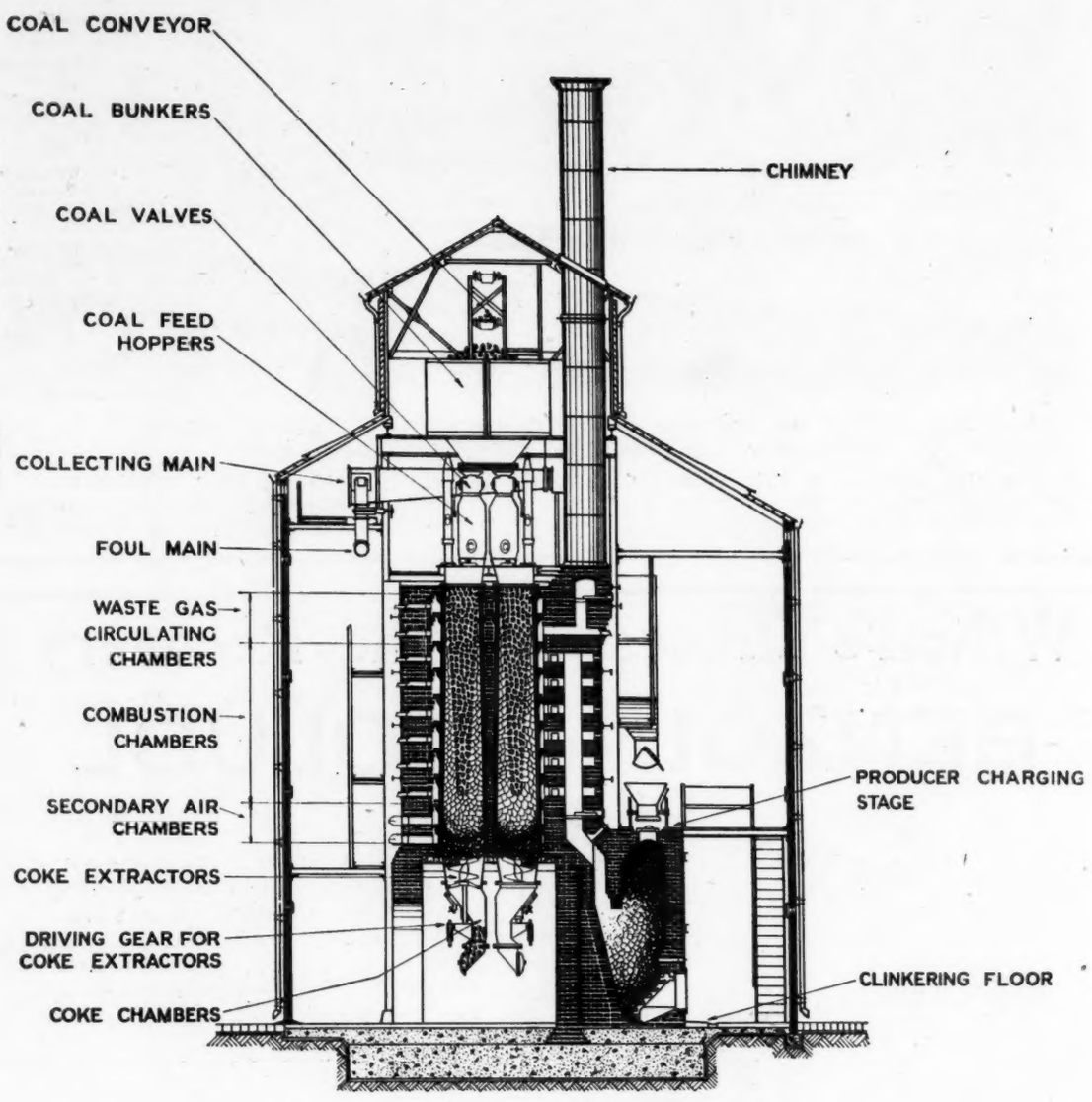

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Gas-Works Offices,
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TENDERS are invited for the Surplus TAR produced between July 1, 1916, and June 30, 1917.
Estimated quantity, 1200 Tons.
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J. E. Lamb,
General Manager.
Gas Offices, Altrincham,
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HAVERHILL URBAN DISTRICT COUNCIL.

TENDERS FOR COAL.

THE Haverhill Urban District Council invite TENDERS for the Supply of 800, 1400, or 2000 Tons of Best GAS COAL (Screened or Unscreened) to be Delivered free at the Haverhill (Great-Eastern Railway) Station in such quantities and at such periods as may be ordered from time to time between the 1st day of September next and the 31st day of August, 1917.
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The Council reserve the right to divide the Contract as they think fit, and do not bind themselves to accept the lowest or any Tender.
Sealed Tenders, endorsed "Gas," to be Delivered to me on or before the 11th of July, 1916.
James Beasley,
Clerk.
Haverhill, Suffolk,
June 21, 1916.

SALES BY AUCTION OF GAS AND WATER STOCKS AND SHARES.

MESSRS. A. & W. RICHARDS beg to notify that their SALES BY AUCTION of NEW CAPITAL ISSUED UNDER PARLIAMENTARY POWERS, and of STOCKS and SHARES belonging to EXECUTORS and other PRIVATE OWNERS in LONDON, SUBURBAN, and PROVINCIAL GAS and WATER COMPANIES, take place PERIODICALLY at THE MART, TOKENHOUSE YARD, E.C.
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By order of the Directors of the
GRAYS AND TILBURY GAS COMPANY.

MESSRS. A. & W. RICHARDS have RECEIVED INSTRUCTIONS TO OFFER FOR SALE BY TENDER
600 £10 "B" SHARES
in the above Undertaking, ranking for a Standard Dividend of Seven per cent. subject to the Sliding-Scale equally with the existing similar Shares now receiving £5 19s. per Cent. per Annum.
Tenders will be opened on Thursday, July 6.
Particulars and Forms of Tender may be obtained at the Offices of the Company, 24 to 28, Orsett Road, Grays, and of Messrs. A. & W. Richards, Auctioneers, 37, Walbrook, E.C.

THE GASLIGHT AND COKE COMPANY.

NOTICE is Hereby Given that the TRANSFER BOOKS of this Company, SO FAR AS THEY RELATE TO CAPITAL STOCKS, WILL BE CLOSED at Four o'clock p.m. on Tuesday, the 4th day of July next, and WILL BE RE-OPENED immediately after the Half-Yearly Ordinary General Meeting of the Company, to be held on Friday, the 4th day of August next.
By order,
Henry Rayner,
Secretary.
Chief Office: Horseferry Road,
Westminster, S.W., June 19, 1916.

MALTA AND MEDITERRANEAN GAS COMPANY, LIMITED.

TO THE SHAREHOLDERS.

NOTICE is Hereby Given, that the ORDINARY GENERAL MEETING of the Shareholders of this Company will be held at the Offices, 59 & 60, Gracechurch Street, London, E.C., on Tuesday, the 11th of July, 1916, at 11.30 o'clock a.m., for the purpose of receiving the Report of the Directors and the Accounts for the Year ended the 31st of March, 1916, and for the Transaction of the General Business of the Company.
One of the Directors, Mr. Arthur Matthews Paddon, retires from office, and offers himself for re-election.
The Auditors, Mr. Ernest Lionel Burton, F.S.A.A., and Mr. William Cash, F.C.A., retire, and offer themselves for re-election.
The TRANSFER BOOKS WILL BE CLOSED from the 27th of June until the day of the Meeting, both days inclusive.
And Notice is Hereby Also Given that, at the conclusion of the Business of the said Ordinary General Meeting, an EXTRAORDINARY GENERAL MEETING of the Company will be held, when the subjoined Resolutions will be proposed with a view to the subsequent confirmation thereof as Special Resolutions—namely:
(1.) That Article 36 of the Articles of Association, be altered by omitting from the first and second lines thereof the words "with the sanction of an Extraordinary General Meeting."
(2.) That Article 85, of the Articles of Association, be altered by adding immediately at the end thereof the words, "including power to raise or borrow or secure the payment of any sum or sums of money with or without security, for the purposes of the Company."
And Notice is Hereby also Given that a FURTHER EXTRAORDINARY GENERAL MEETING of the Company will be held on Tuesday, the 1st day of August, 1916, at the same time and place, for the purpose of receiving a Report of the proceedings at the above-mentioned Meeting, and of confirming, if thought fit, as Special Resolutions, the Resolutions above set out.
By order of the Board,
C. J. Daun,
Secretary.
59 & 60, Gracechurch Street, E.C.,
June 20, 1916.

PATENTS.—Handbook of Patent Law, by W. P. Thompson, F.C.S., M.I.Mech.E., C.P.A., International Patent Agent, 6, Lord Street, Liverpool, and Bradford and London. 16th Edition 1915, 242 pages. 2s. 6d. Post free. English Portion, 6d. "A useful guide to inventors. The subject is treated in a simple and concise manner."—Journal of Gas Lighting.

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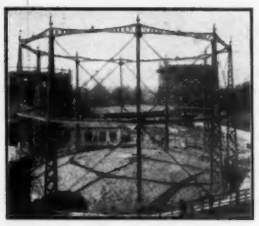
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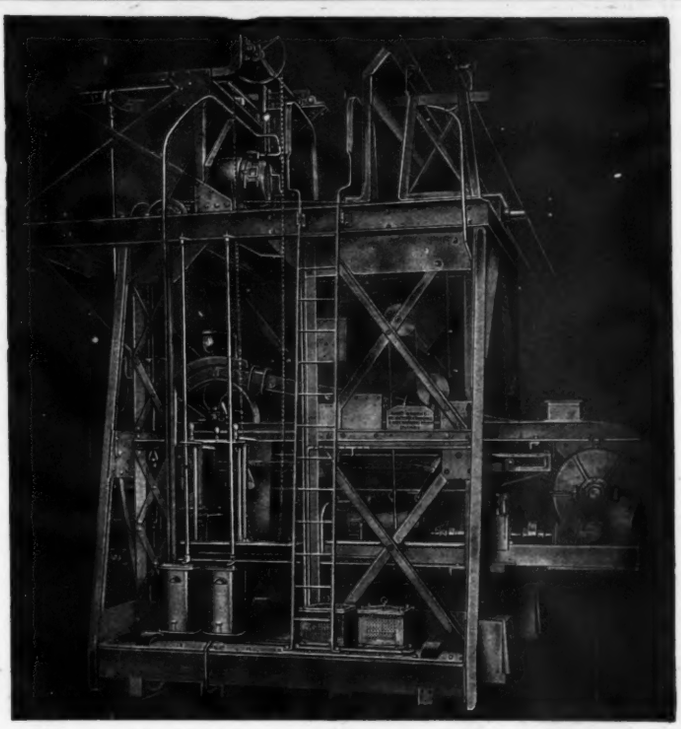

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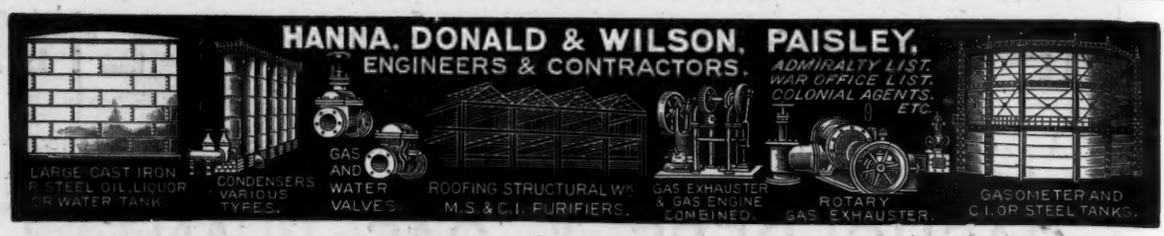
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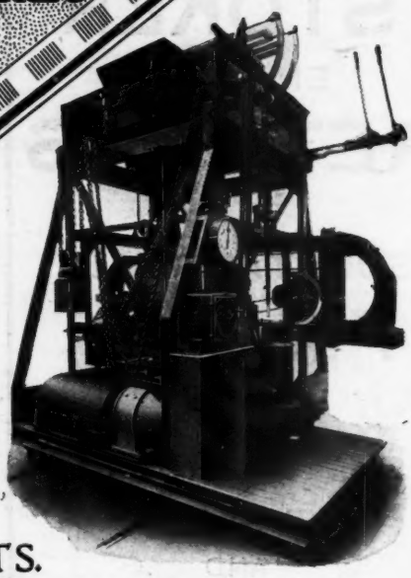

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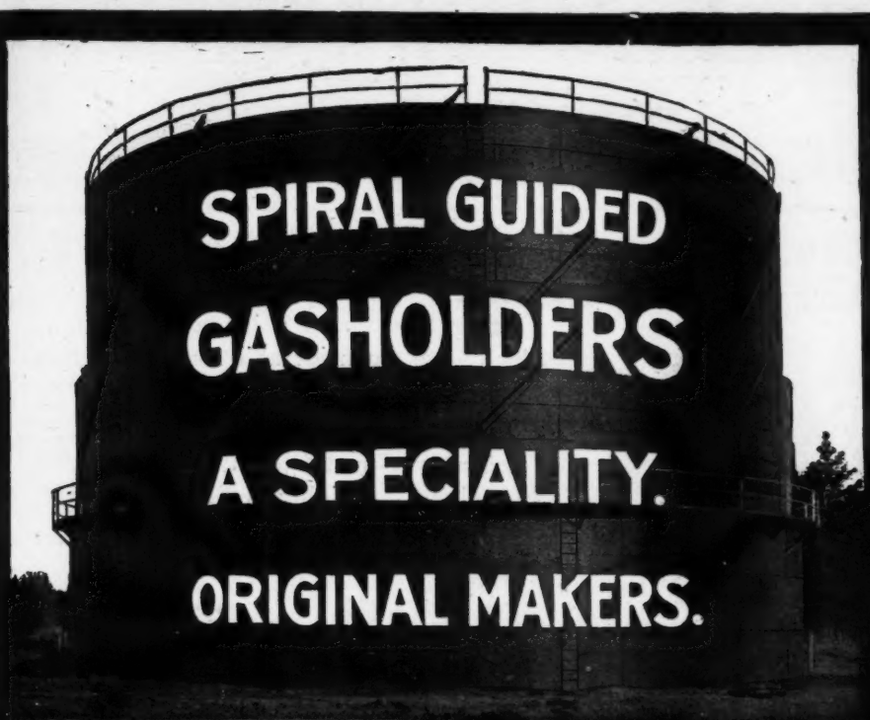

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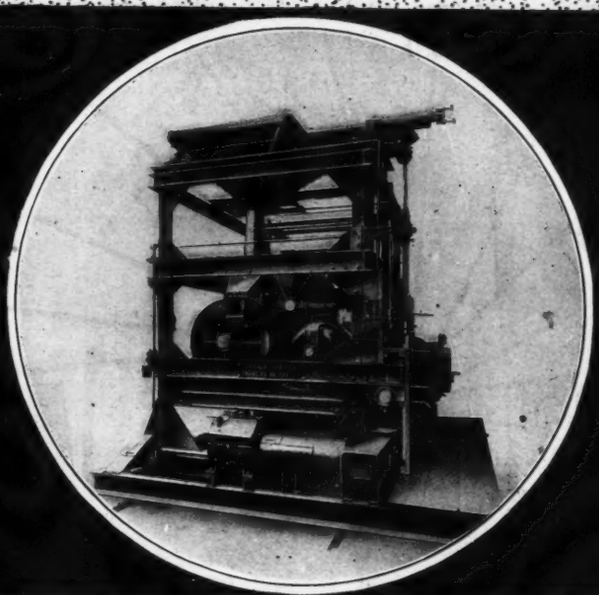

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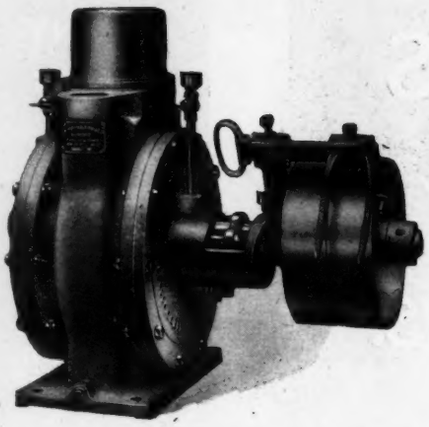

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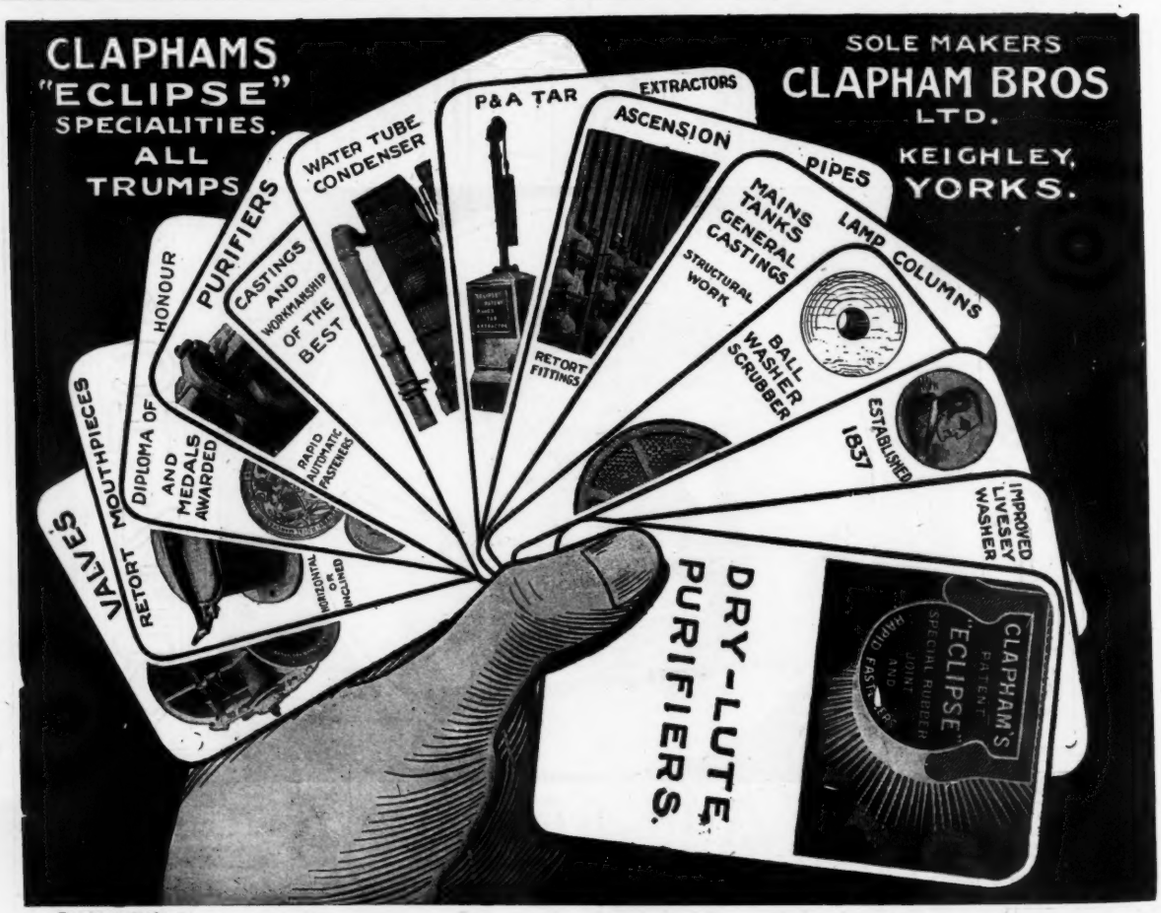

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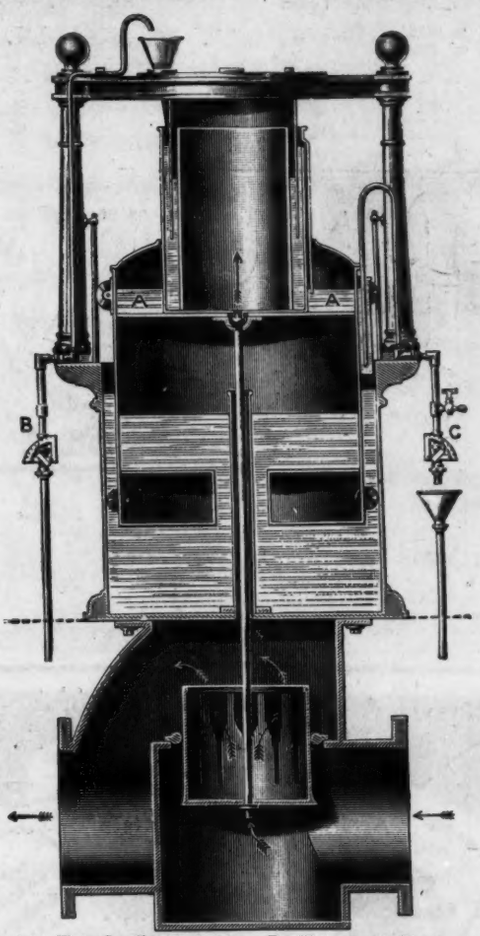

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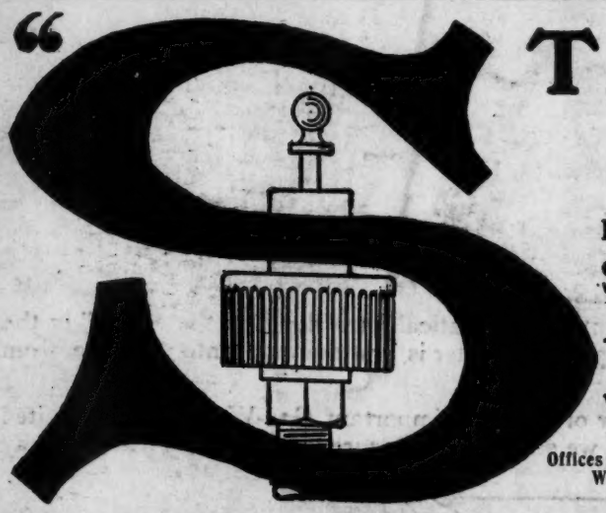

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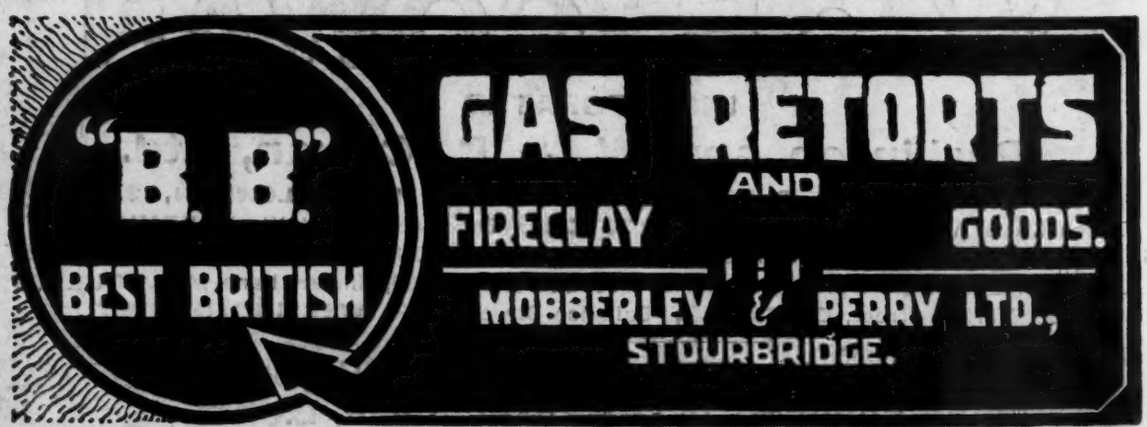

Printed and Published by Walter King, at No. 11, Bolt Court, Fleet Street, in the City of London.—Tuesday, June 27, 1916.